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ABSTRACT

This manual discusses cost effectiveness in evaluating training modalities in population education for Asian and Pacific nations. Chapter 1 defines training modalities and offers 10 models that are in use in this geographic region. Chapters 2 and 5 discuss evaluation, cost effectiveness versus cost benefit analyses, estimating and analyzing costs, input of personnel, financial considerations, equipment, materials, and organization cooperation; while chapters 3 and 4 discuss design, instrumentation, data analysis, and data interpretation based on cost effectiveness. Chapter 6 contains guidelines for preparing a research proposal, and chapter 7 provides a sample proposal and prototype instruments. Tables, charts, and graphs are included. (DJC)

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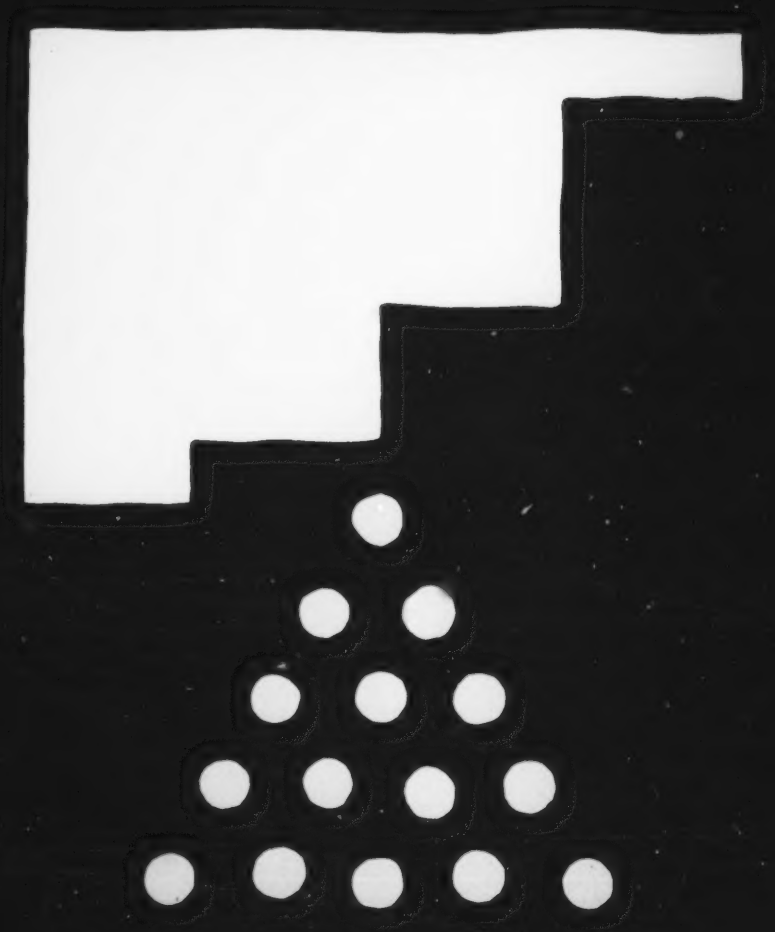

COST-EFFECTIVENESS OF TRAINING MODALITIES IN POPULATION EDUCATION

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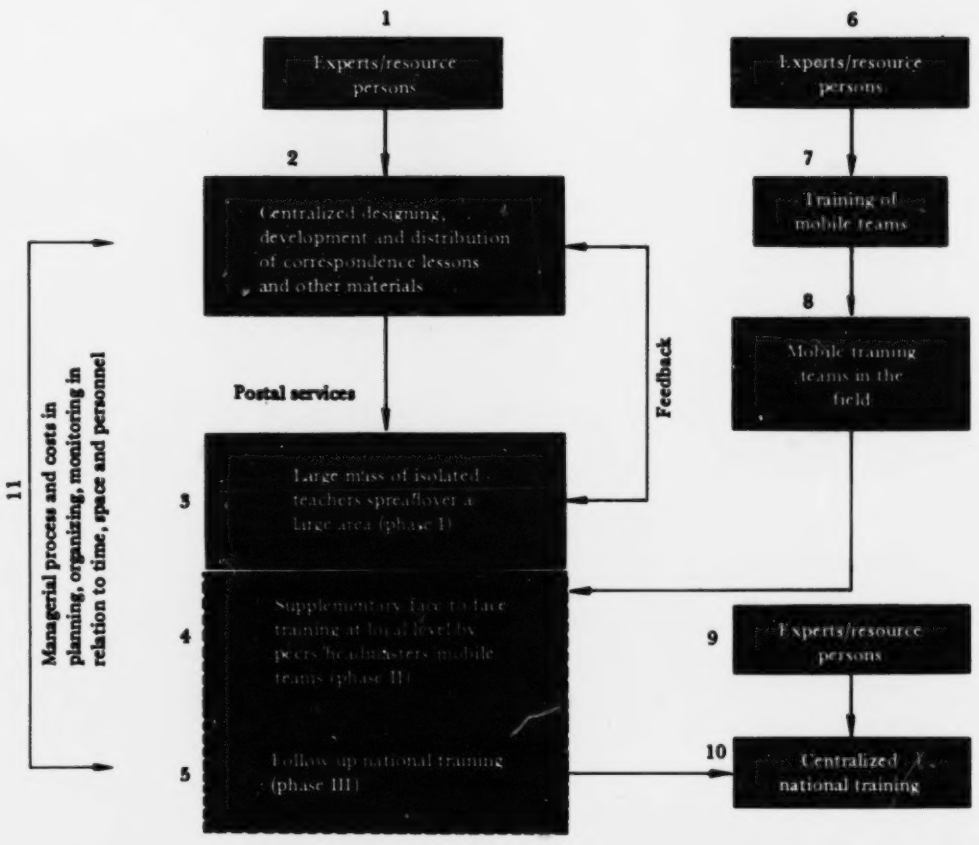

Figure 7. Correspondence Training Model

6. Linked Training

In this model the training of teachers in population education is built into the in-service training activities intended for subject areas in which population education has been integrated. Time is allocated for the teaching of population education within the total training period. This model can be used as a supplement to other models of training.

A variation of this model is the training of primary school teachers on a staggered basis, through the monthly teachers' meetings organized by the ministry of education for the professional growth of teachers and for administrative purposes. (See Figure 8).

7. Training via Educational Radio (ER) and Educational Television (ETV)

In this model specific educational/instructional programmes are developed for radio/television transmission. These programmes are transmitted regularly at pre-determined schedules, indicating time and date. The schools are provided with radio/TV and teachers are expected to listen/view the programmes. The model can be supplemented by providing background resource materials before the broadcasts. The head of the school is responsible for conducting the training programme and sending feedback and evaluation periodically to the district education officers of the concerned officials at the regional/national levels. The supply and maintenance of radio/TV equipment in schools located in remote areas is also organized centrally. The model can be further supplemented with a peer training model and modular training model to make it more effective. (See Figure 9).

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PREFACE

This Manual is the output of a Regional Training Workshop on the Cost-Effectiveness of Different Training Modalities in Population Education which was organized by the Unesco Principal Regional Office in Asia and the Pacific in Kathmandu, Nepal from 1 to 8 June 1987.

Ten participants and resource persons from China, India, Indonesia, Maldives, Nepal, the Philippines, and Thailand took part in the workshop. The two resource persons were Dr. V.R. Gaikwad, Professor, Indian Institute of Management, India; and Dr. Milagros Ibe, Professor, College of Education, University of the Philippines, Philippines.

The Manual is a simplified presentation of how project staff of country projects can carry out studies on the cost effectiveness of different training modalities used in population education programmes. So as not to overwhelm those who are not too familiar with cost-effectiveness studies the data analysis is deliberately made simple.

It is hoped that this Manual will enable the project staff of country projects to initiate studies which will help them select the most cost-effective training modalities in population education.

Such studies can go a long way towards ensuring optimal use of limited resources available for the training of population education teachers and fieldworkers.

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CHAPTER ONE

Training Modalities in Population Education

In many countries of Asia and the Pacific, population education is recognized as one of the leading educational innovations. Population education is the education sectors' invaluable contribution towards the multi-sectoral effort designed to mitigate the negative impact of unplanned population growth on the development programmes of countries in the region.[1]

From the beginning it was realized that population education can only be as good as the teachers, field workers and key personnel responsible for its implementation. As such, there was a need for a massive in-service and pre-service training of teachers and field workers. Each country decides *how it should go about training* the huge number of teachers and other personnel in population education.

Meaning of the Term "Modality"

A training modality is a general approach and strategy for designing and sequencing training inputs to produce the desired effectiveness. It has two dimensions: technical and managerial. The technical dimension covers the methods and instruments that are used to achieve the objectives. The managerial dimension covers how various actions/activities associated with the approach and strategy are planned, organized, executed, monitored and evaluated, so that the methods/instruments and materials could be implemented effectively and efficiently. This dimension primarily deals with division of work (in terms of time, space and personnel for a given task and sub-task), co-ordination, supervision and control.

It is acknowledged that an intrinsically good training method or instrument may become ineffective due to weakness in the management process. On the other hand, an intrinsically bad method or instrument will not be effective in spite of good management. Thus, the technical and managerial dimensions of a modality, individually and interactively, determine the effectiveness of a programme.

It follows that understanding a modality will require a thorough study of the internal aspects of the programme management process. It is obvious that different modalities will require different degrees of managerial competence and efforts, and will have different cost centres and cost structures.

Thus, a modality is a wider concept in the sense that within a selected approach and strategy framework it may use more than one method or instrument of training, each having different managerial connotation. Evaluating a modality (or comparing different modalities) does not merely cover the method/instrument and materials for training, but also includes the approach, the strategy, and the managerial aspects of training along with the associated costs.

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[1] Leonardo de la Cruz, "Training Modalities in Population Education: The Asia and Oceania Experience" UNESCO, ROEAP, Bangkok, November 1980, p. 1 (mimeographed).

Two factors are generally considered in the selection of training modalities, namely the appropriateness of the method for a particular requirement, and the economic aspect, that is, the cost.

Training modalities can be classified as follows:

1. The amount of participant activity allowed in the modality,
2. The amount of emphasis on cognitive learning, and
3. The amount of emphasis on providing experience to and scope for experimentation by the participants.

It should be noted that each of these three dimensions has to be treated as a continuum from high to low. For example, the amount of participation can vary from high participation to low participation. It should also be noted that various permutations and combinations of these dimensions can be used in a training programme. Each method has its merits and demerits and there is as yet no empirical evidences which can vouch for one model of training vis-a-vis another.

Analyzing "Strategy"

Each country chooses a strategy that is most appropriate for its particular requirements. In deciding the strategy, the questions generally asked are:

(a) What results are desired, when, and at what costs?

(b) What alternatives are available to the country for achieving the desired results?

A question generally faced by many countries is whether the population education programme should:

(1) concentrate on specific target group/s, or (2) cover all segments of the population with great intensity, or (3) be spread thinly, covering all segments of population with low intensity. From these three alternative courses of action, a country has to choose one or a combination thereof. Each alternative course has its own implications.

The first alternative is generally considered when a country has limited funds, and desires quick results and a controllable rate of change in population growth rate. It is also considered when the political environment is such that it can handle criticisms about class/group/regional discrimination.

The second alternative is generally considered when funds are available and the country is not particularly concerned about the long-term effects of uncontrolled reduction in the population growth rate. It is also considered when the political environment cannot handle criticisms about class/group/regional discrimination.

The third alternative is generally considered when funds are limited and the country is not concerned about the long-term effects of uncontrolled reduction (retardation) in the population growth rate. It is also considered when the political environment cannot handle criticisms about class/group/regional discrimination.

These three alternatives when considered as being dichotomous and in various permutations and combinations lead to eight alternate strategies. (See Figure 1).

If a country decides on a "specific" target population, then the questions are:

1. Where to concentrate? Densely populated regions having high population growth rates, or less densely populated regions?
2. Which class of people? Should the population programme cover low income (poor), middle income, or high income population groups?

3. Which categories of persons/groups? Those already enjoying greater opportunities for exposure to population education (PE) messages, or those having little or no opportunities for such exposures.

These are various alternatives from which a country can choose. The three categories when considered as dichotomous and in various permutations and combinations lead to eight possible alternate strategies. (See figure 2). Each strategy has its own implications in terms of costs, coverage, and intensity of training.

Training Modalities

The training modalities which are generally used in different countries in the Asian region are the following:[2]

1. Hierarchical face-to-face training
2. Peer group training
3. Mobile training
4. Self-learning model
5. Training via correspondence
6. Linked training
7. Training via educational radio and television
8. Field operational seminar
9. Internship and attachment programme
10. Eclectic training model

Each training modality is provided with a flow-chart which presents the major task components or units of operation that are related to both the main training activities and support services. In general, each cell (component) indicates a discrete activity and could be treated as a cost centre. The numbering of the cells, as far as possible, indicates the sequencing of activities, though in some complex models this may not be so. The overall scope of the managerial process is indicated by the bracket on the right hand side.

Each of the training modalities cited above are briefly discussed below and in the pages which follow:

1. Hierarchical Face-to-Face Training Model

In this model, the training continuum consists of successive training efforts for different levels/categories of educational personnel in the descending order of the hieranchy. The initial or first step is the recruitment of experts/resource persons. The second step is face-to-face training of project/programme personnel at the national/international level. In the third step, these trained personnel train a selected group of specialists or master trainers at the national level. In the fourth step, these master trainers train the second group of trainers (teacher educators, district education officers, principals, college professors, and others). This second group, in turn (the fifth step), train teachers at the district, sub-district, or village levels. This four- step model places the teacher who is the main target of the training programme, at the end of the line and as a receiver of what is passed on from the top (see Figure 3).

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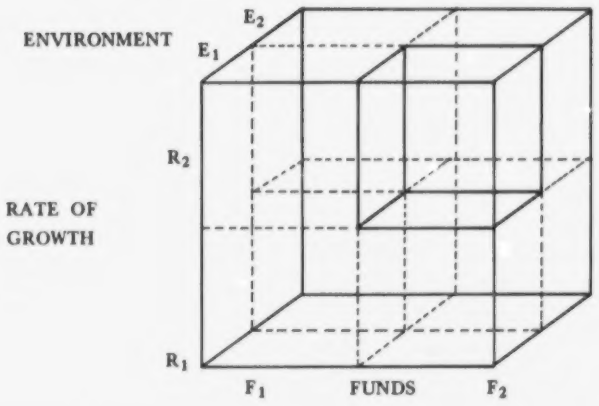
[2] The descriptive part for this section is primarily based on the paper by R.C. Sharma. "Alternative Models of Training in Population Education in Asia and the Pacific". Unesco, PROAP, Bangkok, 1981, pp. 14 (mimeo).



1. $F_1 R_1 E_1$
2. $F_1 R_1 E_2$
3. $F_2 R_1 E_1$
4. $F_2 R_1 E_2$
5. $F_1 R_2 E_1$
6. $F_1 R_2 E_2$
7. $F_2 R_2 E_1$
8. $F_2 R_2 E_2$

The Choice
$F_2 R_2 E_1$ is marked.
i.e. Funds no problem, uncontrolled rate of retardation, and environment can handle criticism.

Assuming:

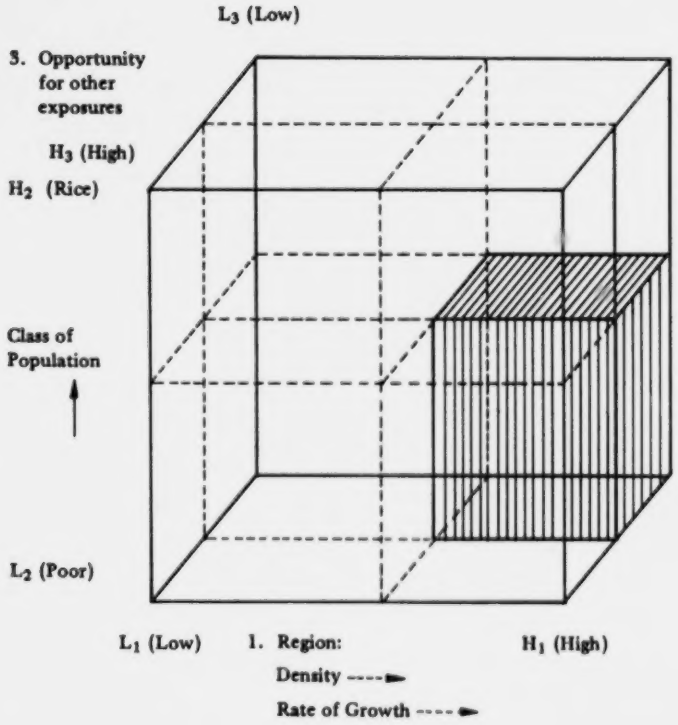
F_1 = Limited Funds
F_2 = Funds No Problem
R_1 = Controlled Rate of Growth Desired
R_2 = Uncontrolled Rate of Growth
E_1 = Political Environment Can Handle Criticism
E_2 = Political Environment Can't Handle Criticism

We obtain the model as shown in the Figure.

The above gives *eight* alternate *strategies.*

Note: Covering entire population (Choice 2 and 3) will lead to exponential rate of change (Retardation) due to higher *diffusion* effect. In future this may lead to *uncontrolled slowing down* of population growth rate as faced by some developed countries.

Figure 1. Alternate Strategies



1. $L_1\ L_2\ L_3$
2. $L_1\ L_2\ L_3$
3. $L_1\ H_2\ L_3$
4. $L_1\ H_2\ H_3$
5. $H_1\ L_2\ L_3$
6. $H_1\ L_2\ H_3$
7. $H_1\ H_2\ L_3$
8. $H_1\ H_2\ H_3$

The Choice $\boxed{H_1\ H_2\ L_3}$ is shaded in the Figure.

TT refers to: teachers working with poor class of people, living in densely populated region having high growth rate, and having fewer opportunities for other media exposures.

Figure 2. Available Alternatives under the choice "Specific Target Population"

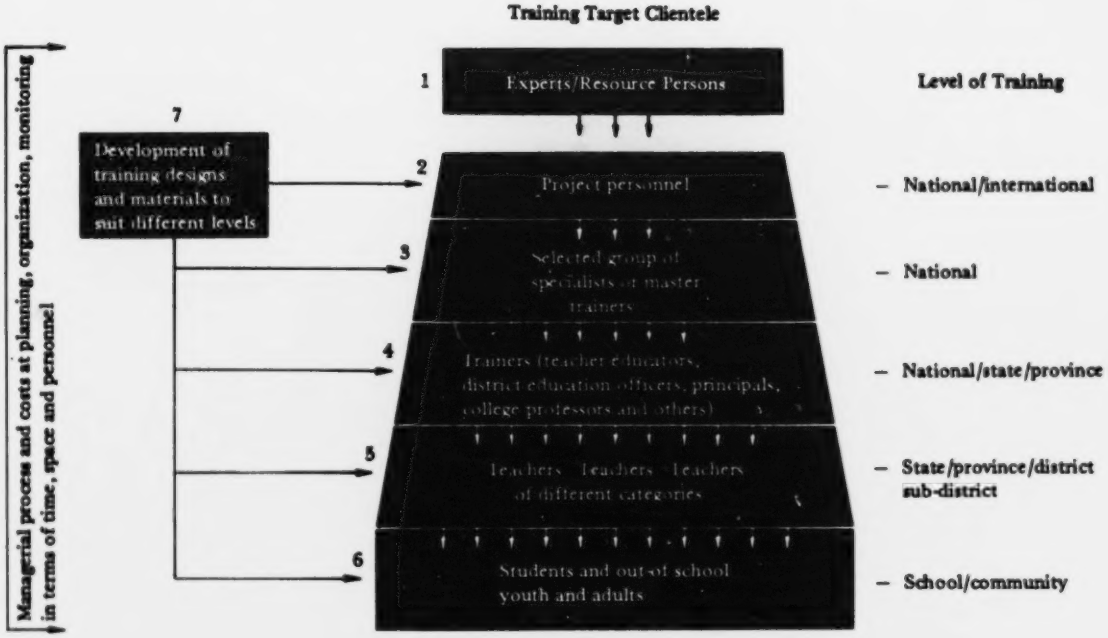


Figure 3. Hierarchical Face-to-Face Training Model

2. Peer Group Training

In this model, the principals and subject heads or co-ordinators in each secondary school are trained by teacher trainers through face-to-face training and they in turn are given responsibility for training teachers in their own schools or in neighbouring schools. Each institution is provided a complete set of training materials, including training manuals, teachers' guides or audio-visuals aids, evaluation tools, and so on. Each school sets up its own schedule of training of teachers, and is required to make a report of its training programme to the district education officer, who submits the consolidated information to concerned officers at the regional/provincial/national levels. Under this model, supervisory teams also visit the schools and provide on-the-spot assistance, guidance, as well as evaluation of the training programmes. (See Figure 4).

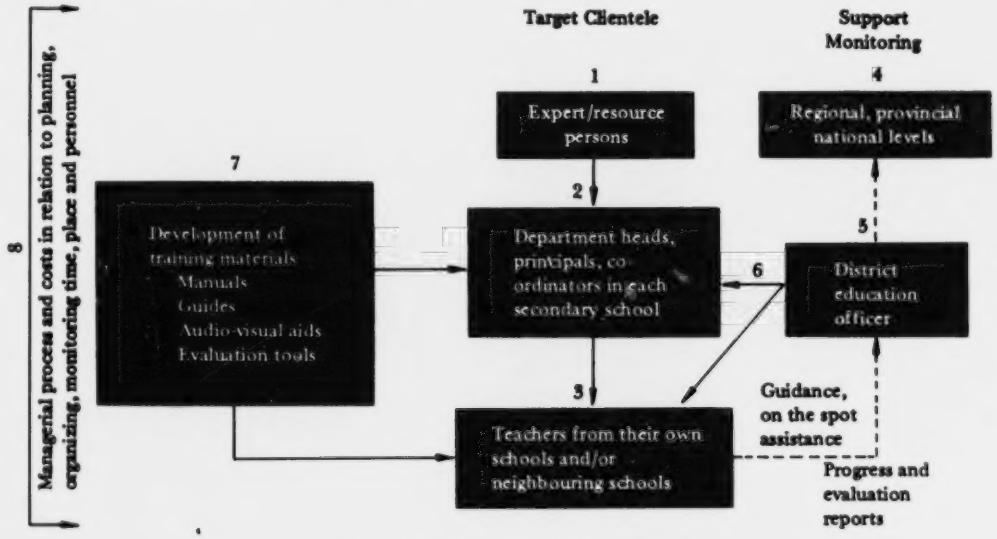


Figure 4. Peer Group Training Model

3. Mobile Training

This model consists of floating and mobile teams comprising trained, competent, and highly experienced teachers, administrators, and supervisors who conduct teachers' training programmes in the schools or in designated training centres. These teams are equipped with a variety of instructional materials, aids, and equipment. The team members can be rotated during the course of the training, thus minimizing the absence of members from their respective posts for long periods and also giving other competent teachers and administrators the opportunity to act as trainers. The training is organized at a stretch, or during school vacations and weekends, as may be convenient to the teachers and administratively feasible in a particular area. (See Figure 5).

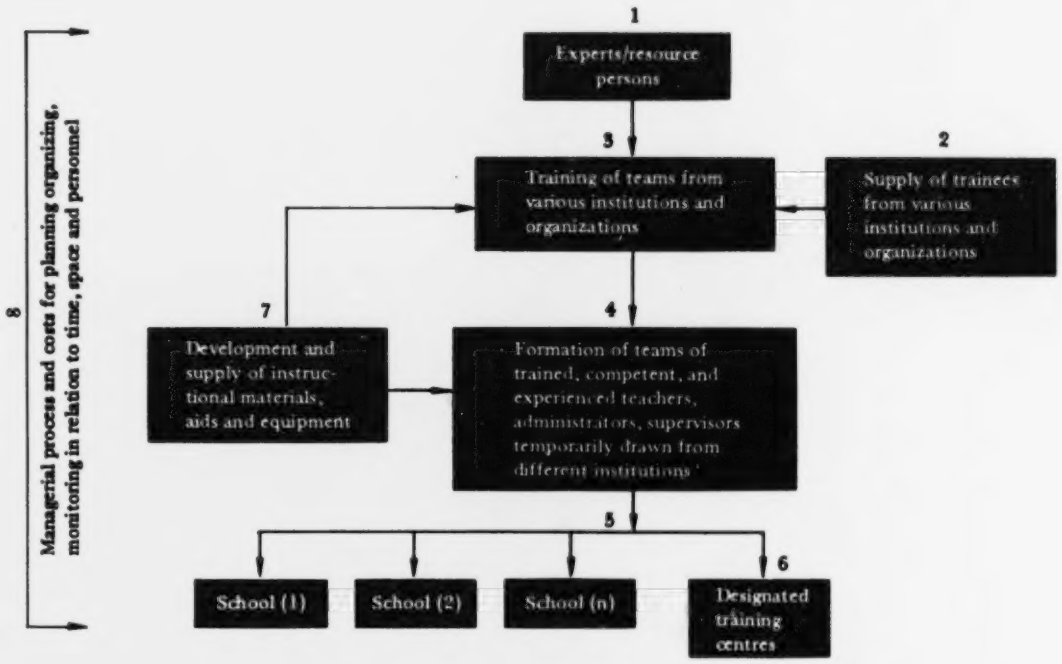

1
Experts/resource persons
3
Training of teams from various institutions and organizations
2
Supply of trainees from various institutions and organizations
7
Development and supply of instructional materials, aids and equipment
4
Formation of teams of trained, competent, and experienced teachers, administrators, supervisors temporarily drawn from different institutions
5
6
School (1)
School (2)
School (n)
Designated training centres
8
Managerial process and costs for planning organizing, monitoring in relation to time, space and personnel

Figure 5. Mobile Training Model

4. Modular or Self-Learning Model

In this training model, materials in the form of modules are provided for the independent and direct training of teachers. The training materials and modules are designed and prepared at a central location and distributed to selected trainees. Each teacher trainee learns on his own from these modules. A feedback system is generally incorporated in the module, enabling the trainee to evaluate his own performance. This method requires minimum supervision and is easy to administer. It is more economical, entailing a minimum of logistical problems. However, a crucial need in using this model is to ensure the motivation of teachers to use the self-learning modules (SLEM) especially when such a self-learning method is not associated with any reward system, (See Figure 6a).

There are three supplementary methods associated with this model. In one method the teachers discuss the modules after reading them, under the direction and leadership of the school headmaster, who acts as course manager and trainer. The headmaster has previously received intensive face-to-face training in population education as well as in the use of SLEM. The module also includes a management module for the headmaster's use. (See Figure 6b).

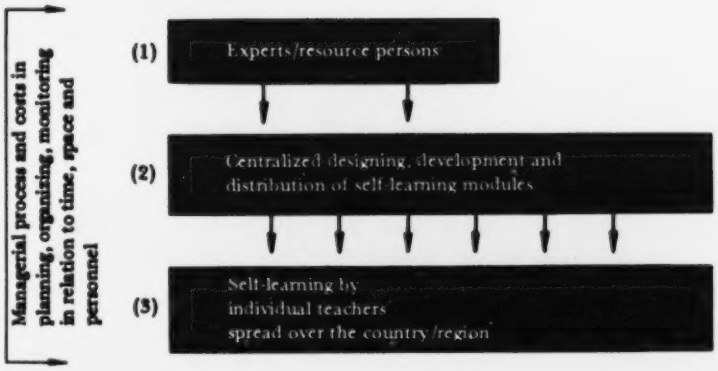

Managerial process and costs in planning, organizing, monitoring in relation to time, space and personnel
(1)
Experts/resource persons
(2)
Centralized designing, development and distribution of self-learning modules
(3)
Self-learning by individual teachers spread over the country/region

Figure 6(a). Modular or Self-learning Training Model

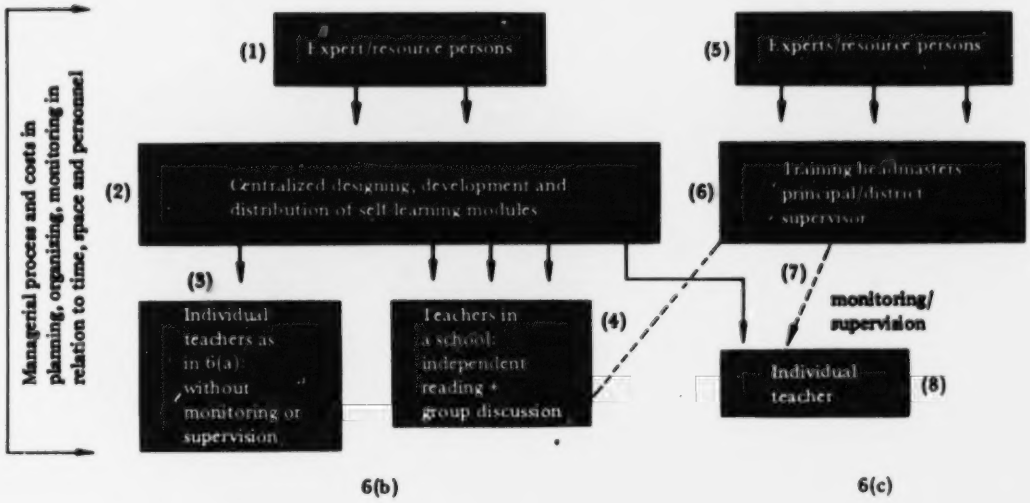


Figure 6(b) and 6(c). Supplementary Methods for Modular and Self-learning Training Model

The second method is a slight variation of the above. Here, the trainee's progress is monitored by a population education-trained principal or public school district supervisor or high school principal and/or trained department head, depending upon the level of the trainee. In this method, a manager's guide module is also provided. (See Figure 6c).

The third methods makes use of both printed materials and video/video cassette tapes. The use of the video recording system (VTR) is a recent development in some countries of the region.

5. Training via Correspondence

In this model, correspondence lessons and other learning materials are sent to trainees through the postal service. There is a regular feedback mechanism so that the trainees' learning can be evaluated and conveyed to him. The correspondence phase is supplemented with some kind of face-to-face training sessions at the local level, either by the trainees' peers or the headmasters of mobile training teams. In some cases, a follow-up national training of the trainees is carried out. (See Figure 7).

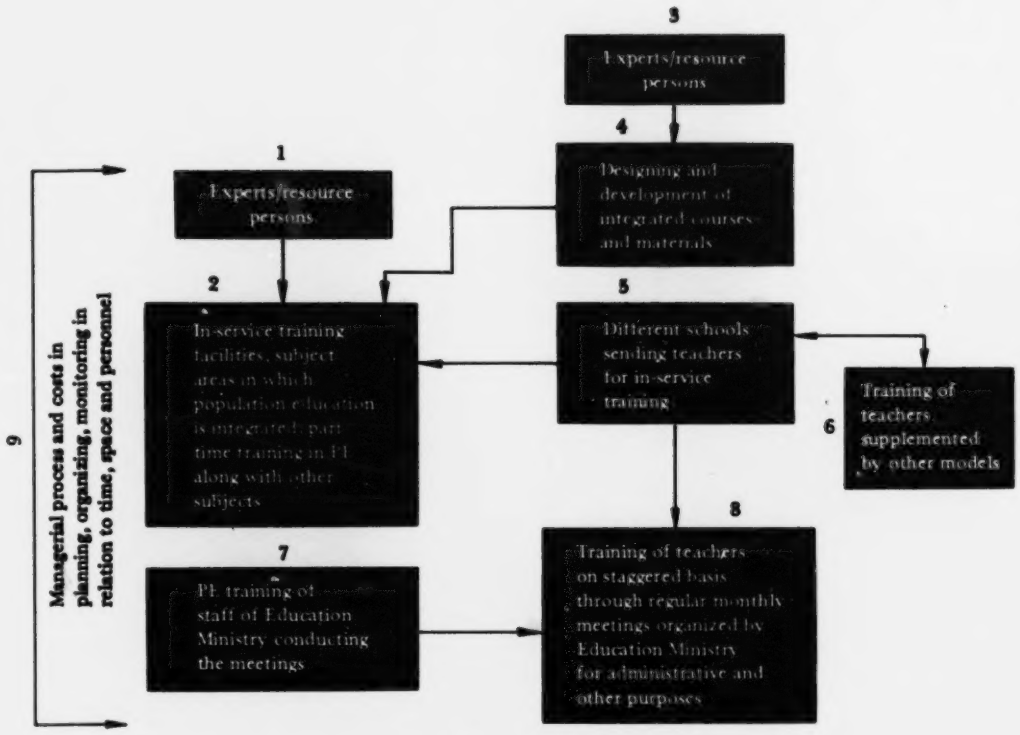

3
Experts/resource persons
4
Designing and development of integrated courses and materials
1
Experts/resource persons
2
In-service training facilities, subject areas in which population education is integrated; part time training in FE along with other subjects
5
Different schools sending teachers for in-service training
6
Training of teachers supplemented by other models
9
Managerial process and costs in planning, organizing, monitoring in relation to time, space and personnel
7
PE training of staff of Education Ministry conducting the meetings
8
Training of teachers on staggered basis through regular monthly meetings organized by Education Ministry for administrative and other purposes

Figure 8. Linked Training Model

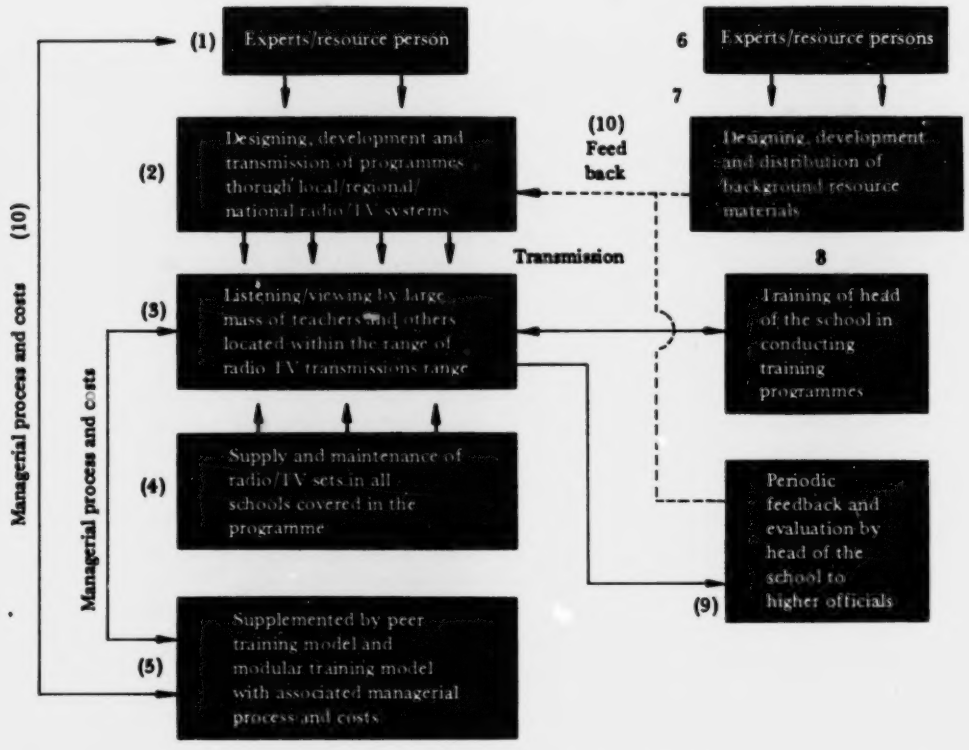

(1)
Experts/resource person
6
Experts/resource persons
7
(2)
Designing, development and transmission of programmes thorugh local/regional/ national radio/TV systems
(10) Feed back
Designing, development and distribution of background resource materials
Transmission
8
(3)
Listening/viewing by large mass of teachers and others located within the range of radio TV transmissions range
Training of head of the school in conducting training programmes
(10)
Managerial process and costs
Managerial process and costs
(4)
Supply and maintenance of radio/TV sets in all schools covered in the programme
Periodic feedback and evaluation by head of the school to higher officials
(9)
(5)
Supplemented by peer training model and modular training model with associated managerial process and costs

Figure 9. ER and ETV Training Models

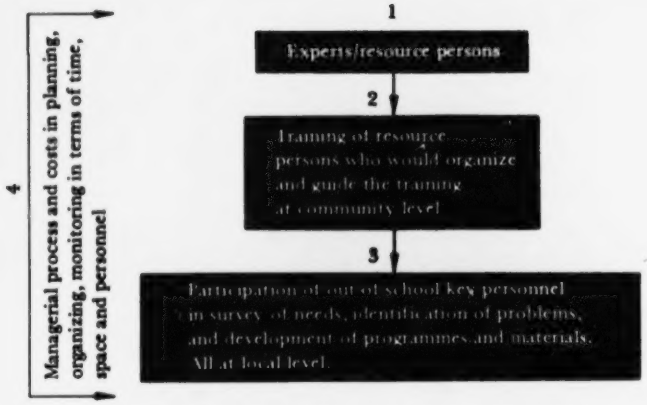

1
Experts/resource persons
2
Training of resource persons who would organize and guide the training at community level
3
Participation of out-of-school key personnel in survey of needs, identification of problems, and development of programmes and materials. All at local level
4
Managerial process and costs in planning, organizing, monitoring in terms of time, space and personnel

Figure 10. Field Operational Training Model for Out-of-School Key Personnel

8. Field Operational Seminar

This model is based on participatory activities in a rural community where out-of-school key personnel surveys the needs of the community, identifies their problems, and develops programmes and materials which are need-based. This model involves the training of resource persons who are expected to organize the participants from a community and to guide them in a survey of their needs, the identification of problems, and the development of programmes and materials. (See Figure 10).

9. Internship and Attachment Programmes

This model involves the training of key personnel from different countries in population education, as well as in documentation. The interns work on specific areas of population education through self-study under the direction of the Unesco Regional Team on Population Education. This model can also be used at the national level in the training of key persons.

In a variation of this model, key personnel are attached for a period of one to three months to successful programmes in population education. Under this variation, the trainee works as a member of the local staff and gains full experience in the substantive as well as operational aspects of the programme (See Figure 11).

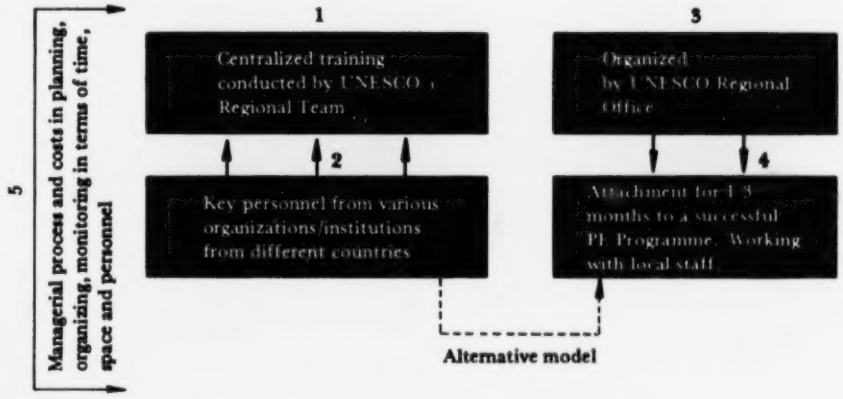

1
Centralized training conducted by UNESCO Regional Team
2
Key personnel from various organizations/institutions from different countries
3
Organized by UNESCO Regional Office
4
Attachment for 1-3 months to a successful PE Programme. Working with local staff
Alternative model
5
Managerial process and costs in planning, organizing, monitoring in terms of time, space and personnel

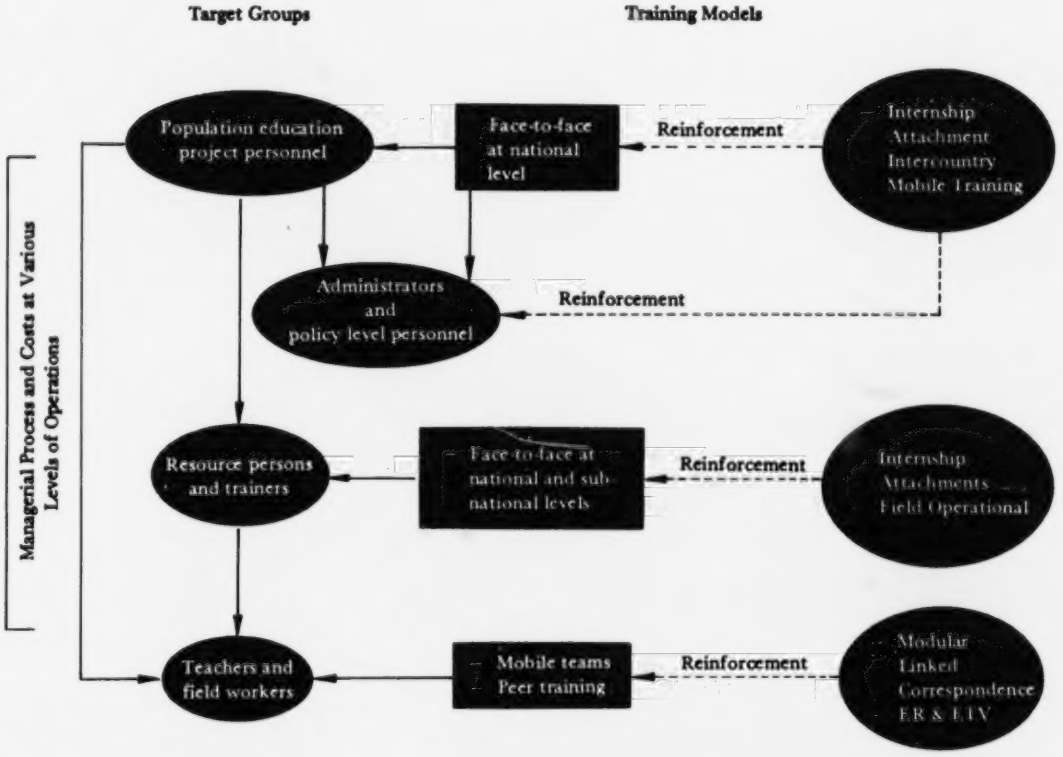
Figure 11. Internship and Attachment

10. Eclectic Training Model

This model combines all the above models for training different categories of personnel as shown is Figure 12. The model envisages four main categories of personnel namely, population education project personnel, administrators and policy level personnel; resource persons and trainers; and teachers and field workers. For each category, some training models have been suggested which can be reinforced or supplemented by other models depending upon the needs and resources of a particular country. The main strategy used in this model is that a manageable number of population education project personnel, administrators, and resource persons and trainers, requiring extensive training are trained through face-to-face models. Teachers and field workers, on the other hand, are trained through mobile teams and/or peer training models. The training of teachers and field workers can be supplemented by modular, linked, correspondence and/or educational radio and ETV.

It could be seen from the above brief description of various models that these models vary in terms of:

i) approach and strategies, ii) tasks, sub-tasks and operational level activities, iii) supportive services; iv) instruments of teaching/learning, v) managerial processes and efforts in planning, organizing, implementing, monitoring and evaluation, vi) cost centres and cost structures (fixed costs, variable costs and opportunity costs), vii) coverage of target population, viii) and expected intensity of learning.



Source: R.C. Sharma. *Alternative Models of Training in Population Education in Asia and the Pacific.* Unesco, Bangkok, 1981, p. 13 (mimeo).

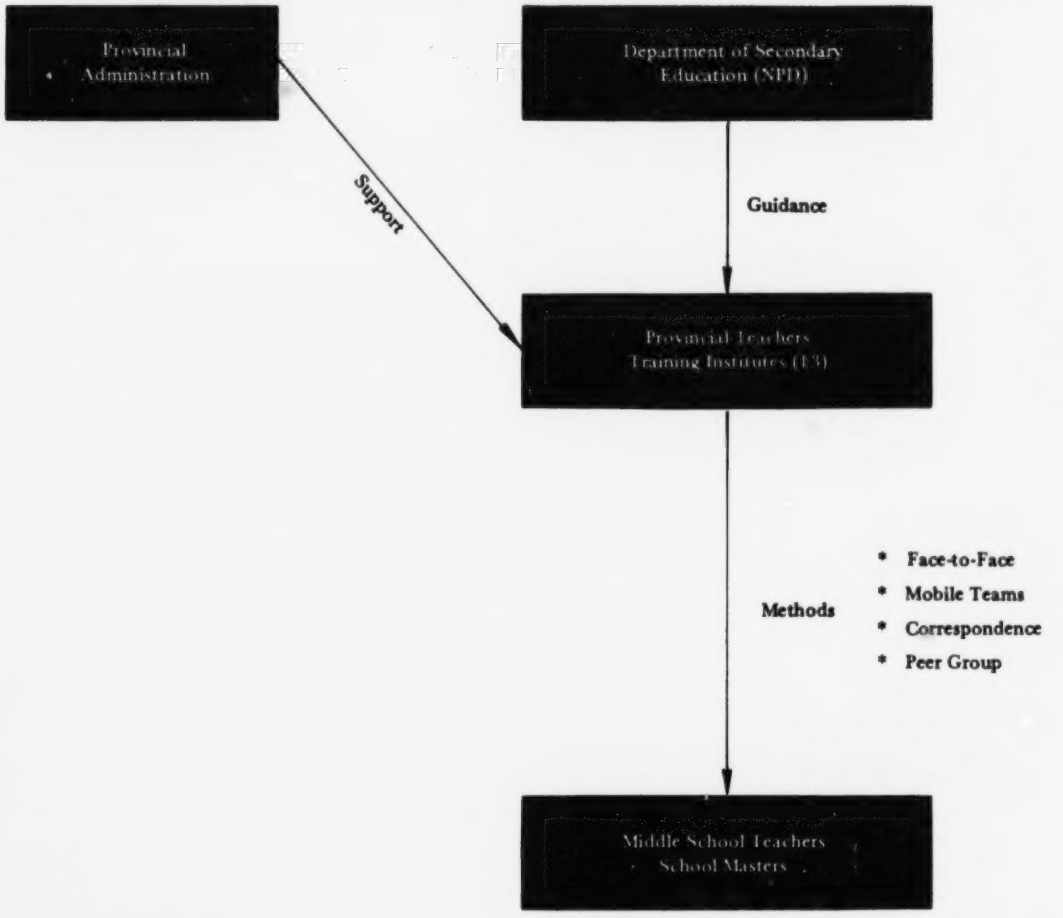
Figure 12. Eclectic Training Model

It follows that even for two programmes following the same model the cost-effectiveness may vary due to: the use of different instruments of teaching since each instrument will have different cost structure and managerial process; and the managerial efficiency in terms of decisions associated with planning, organizing, implementing, monitoring and evaluation. All such decisions will be again in relation to time, space and tasks.

A survey of existing books and other publications revealed that countries in Asia and the Pacific are using not only one but at least three of the training modalities discussed previously. In some cases a combination of two or three methods is used in a given modality.

It is very clear that there has hardly been any systematic study in terms of the cost-effectiveness of these modalities, and the relative cost-effectiveness of different training modalities in population education.

As illustrations, some aspects of the modalities followed in China and Thailand are presented in Figures 13 and 14, respectively. However, a systematic cost-effectiveness study on training modalities in population education has not yet been done in either country.

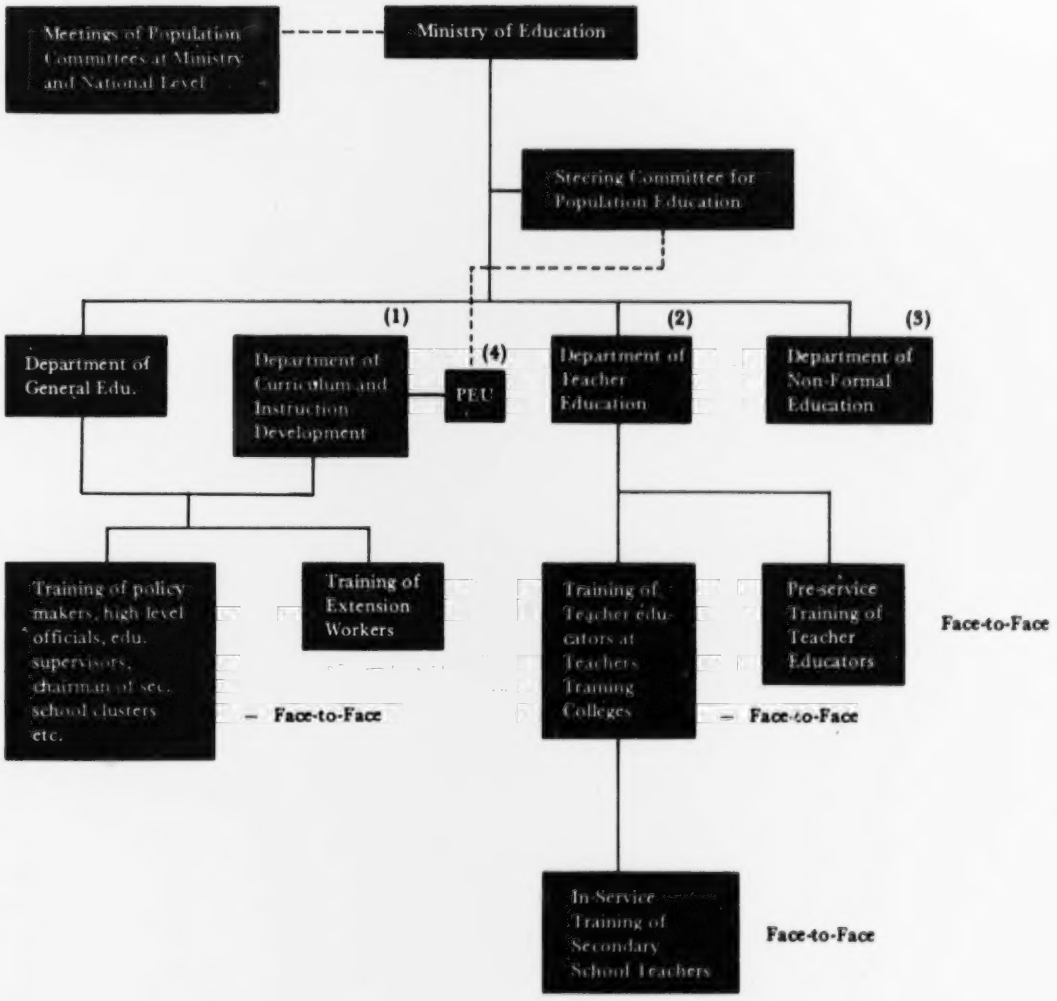


Note:

Strategy: Concentration on middle school teachers initially in selected regions (13)

Approach: 1. Straight, direct message on population related issues, For example, emphasizing one child per family norm.
2. Use of multiple methods for greater impact.

Figure 13. Training Modality in PE in China



Note:

1. Production and distribution of instructional materials both for primary and secondary levels; teaching-learning packages; slides and sound acts; video tapes; PC newsletters.
2. Production of set of learning modules for college instructors and college students radio broadcasts.
3. Production of instructional materials for specific target groups; monthly wall-newspaper; radio broadcast.
4. PEU – Population Education Unit.

Figure 14. Training Modalities in Population Education in Thailand

CHAPTER TWO

Cost Effectiveness: Concept and Process

Introduction

Several programmes and strategies for training personnel have been used in the last few decades. Some evaluation studies of the effects of these strategies have been carried out, using pre-experimental (sometimes referred to as non-experimental), experimental and quasi-experimental designs. However, only a few of these studies have attempted to add a study of costs in relation to the effects.

This chapter introduces the population educator to concepts which are central to an understanding of cost effectiveness and the process by which it is done.

Evaluation

Evaluation may be defined as the gathering of information which can be used for forming judgements, which in turn can be the basis for making decisions. The information gathered in the case of training programmes includes data on effects, that is change in the attitude and perceptions of the trainees. These data are used to answer questions regarding the effectiveness of the training programmes or the modalities and strategies used in them. Decisions concerning programme revision, expansion or discontinuation are based on the information gathered.

Situations which call for pragmatic and realistic decision making, as in the case of funding constraints, require a study of the costs of alternative programmes, projects, or strategies, in order to assist administrators and managers.

Effects are the results or outcomes of an intervention, such as a modality, an approach, or a strategy. The *effectiveness* of an intervention is the extent to which it is able to attain its intended targets or outcomes.

Cost Effectiveness Versus Cost Benefit Analysis

Cost effectiveness (CE) analysis refers to the evaluation of the *costs* and *effects* of programmes with regard to their outcomes. Cost effectiveness is studied once the goal of a programme has been established as being worth pursuing. It has a more modest aim compared with a cost benefit analysis as only costs, not benefits, are compared. Closely related programmes which are considered as being alternative ways of reaching the same goal are compared. CE analysis is used in the evaluation of training modalities as it integrates the results of activities with their costs in way that allows the selection of activities that yield the best training results at specified costs, or that provide a specified level of training at least cost. Both the cost and effectiveness aspects are important and must be integrated to make good decisions in programme development.

Cost benefit analysis, on the other hand, attempts to compare the costs and benefits of a single programme by translating them into monetary terms and comparing the resulting

figures, that is, cost in dollars is compared to benefits in dollars. Problems to be tackled in a cost-benefit analysis can be quite formidable, especially in the evaluation of human resource programmes, because the analysis has to reckon with the problem of how to weigh future benefits against present benefits, or what discount rate to adopt.

When costs are combined with measures of effectiveness and all alternatives can be evaluated according to their costs and their contributions to meeting the same effectiveness criterion, the ingredients for a CE analysis are present. It is assumed that only programmes with similar or identical goals will be compared, and that a common measure of effectiveness will be used to assess them. Obviously, programmes with different objectives will have different indicators of effectiveness, so they cannot be readily compared within the CE framework. Fortunately, in population education all the training modalities discussed in Chapter Two have similar goals.

Costs. Any social intervention or programme has both an outcome and a cost. The *outcome* refers to the result of the intervention. Outcomes of training on educational interventions include such indicators as knowledge gain, attitude change, favourable behavioural intents, greater employability, and so on.

Technically, the cost of a specific intervention is the value of all of the resources that it uses, had these resonance been assigned to their most valuable alternative use. By using resources in one way, the opportunity to use them in another way is forfeited. In this a *cost* has been incurred (Levin, 1983).

Cost-effectiveness Evaluation: The Process

CE can often be done by taking the normal evaluation design and integrating it with a cost component. This means that if competent evaluators are available to contribute to the study, the addition of the cost dimension is all that will be required. This addition can be done through a team approach.

How is CE analysis incorporated in an evaluation study? Questions related to effectiveness include the following:

1) What are the alternatives to be compared?
2) Do these alternatives share a common goal? What objectives do they have in common?
3) What common indicators of effectiveness can be identified?
4) What evaluation research design can be used to compare the alternatives in terms of the indicators of effectiveness?

Analyzing Effectiveness

Each programme objective can be used in constructing an effectiveness measures. In the CE approach, it is necessary to first determine the programme objectives and identify appropriate measures of effectiveness for each.

In the case of training modalities in population education, the following may be the objectives and their corresponding measures of effectiveness:

	Objective		*Measure of Effectiveness*
1)	Heightened level of awareness and increase in knowledge	1)	Increase in score in a pre-test of knowledge
2)	Improvement of trainee's attitude with regard to population education	2)	Increase in score on an attitude scale

Objective	*Measure of Effectiveness*
3) Application of learning from the training programme	3) Behaviour tendencies as shown by scores in a situation test
4) Teaching skills	4) Demonstrated ability to teach population education concepts
5) Trainee satisfaction	5) Positive perceptions of the training programme
6) Multiplier effects	6) Number of persons trained by the trainee; number of persons outside the classroom with whom the trainee shared his knowledge and experiences

Taking three training modalities for illustrative purposes, it is assumed that all three are used for training teachers and field workers in population education at the provincial or state levels. The three training modalities are as follows:

A. Face-to-face conventional instruction for groups of 30 teachers each.

B. Self-instructional modality through print materials complemented by audio and video tapes.

C. Correspondences course/distance learning.

It is assumed that all three modalities have the following objectives:

1) To increase the trainees' knowledge of concepts concerning the nine themes addressed by population education.

2) To develop favourable attitudes towards the messages or thrusts of population education.

3) To develop in the trainees an inclination or intention to apply the concepts and messages learned in the training.

4) To enable the trainees to apply appropriate skills in teaching population education concepts.

Since all three modalities have similar objectives, the same indicators of effectiveness can be applied to each. The indicators corresponding to the four objectives are:

1) Gain in knowledge, as indicated by the difference between the post-training and pre-training score in a knowledge test covering the nine thrusts or themes in population education. (These nine thrusts are discussed in detail in the section on Instrumentation in Chapter Three).

2) Change in attitude as indicated by the difference between the post-training and pre-training scores in an attitude scale covering the themes in population education.

3) Score on a practice or behaviour tendency scale relative to the concepts learned and attitudes acquired.

4) Trainee's teaching skill as observed in a teaching demonstration and rated on an observation rating scale.

All four indicators can be measured immediately after the training. Other indicators of training effectiveness which can be used are the following:

1) Trainee satisfaction, and

2) Multiplier effects.

The number of teachers trained through each modality compared to the targetted number can be used as an index of efficiency of the modality.

For the purpose of a cost-effectiveness analysis, focus is placed on the first three indicators, that is, knowledge gain, attitude change, and behaviour tendency.

The evaluation of effects is based on the evaluation design used. For example, the measures of knowledge gain and attitude change imply a pre-test and post-test design. The measure of behaviour tendency calls for a design using only a post-test. Designs are discussed in Chapter Three.

Estimating Cost

Every ingredient that is used to produce the effects that will be recorded in the evaluation must be identified and included. In a cost analysis, the ingredients needed to pursue the intervention are specified and a value is placed on each of them. When the values of all the ingredients are added, the total cost of the intervention is established.

Each of the three modalities require ingredients in different amounts and mixes, as for example, services of staff, equipment supplies, materials, technical expertise, and so on.

Chart 1 shows a listing of some ingredients for each of the three modalities.

Questions which are important with respect to cost are as follows:

1) What costs are incurred in carrying out each alternative?
2) What is the total cost per alternative?
3) What is the amount of effect/outcome from each alternative?
4) What is the cost per unit of effectiveness?

Expenditures are commonly broken down into direct and indirect categories. *Direct* cost corresponds to what is considered as a short-run variable cost in economic literature, as for example, salaries and wages, supplies, and field expenses. These vary with the level of programme activity. *Indirect* corresponds to what economists refer to as a short-run fixed or "overhead" cost, as for example, administrative, research, and evaluation costs. These do not vary with the level of programme output.

Costs may also be categorized as follows:

1) Fixed cost or development costs,
2) Implementation costs,
3) Costs to trainee's organization, and
4) Costs to trainees themselves.

Fixed costs are those costs which are incurred in the development of a given modality and its associated methods. These are fixed in the sense that they are incurred before the actual training is undertaken and irrespective of the number of persons to be trained. Costs incurred in designing a training curriculum and developing teaching materials and audio-visual materials are included in this category.

Implementation costs are those which are incurred during the training period. Some of these are 'fixed' costs while others vary according to the number of trainees. Fixed costs include the cost of such equipment as overhead projectors and film projectors purchased specially for the training programme. These costs do not generally vary according to number of trainees. Similarly, faculty time cost (that is, salary or honorarium to teaching faculty) is a fixed cost, as it does not generally vary according to number of trainees. On the other hand, the costs of travel, board and lodging, teaching materials distributed to trainees, and so on are variable costs, as they vary according to number of trainees.

Costs to the trainee's organization (as for example, a school or office) are costs incurred by the organization in the training of its personnel. These include travel cost, training stipend, training fees, salary during the training period, and so on. Such costs are covered either by the trainee's organization or by the training institutions. These should be considered under appropriate cost categories. The trainee's organization may also incur the additional cost of employing another teacher during the absence of a teacher sent for training. If this is not done, the work of the absent teacher in the organization is likely to suffer. To the extent that the work suffers, the organization incurs a cost which should be taken into account.

While undergoing training, the trainee may also incur some personal costs. These can include travel cost, loss of salary for the period of training, out-of-pocket expenses during the training period, and so on. Some of these are likely to be covered under appropriate cost categories and should be treated accordingly.

Chart 2.1. A Sample Listing of Ingredients for Three Training Modalities

Ingredient	*Correspondence*	*Modular*	*Mobile*
Personnel	Project Director Project Co-ordinator Professors, Lecturers & other PE experts Regional PE officers Principal & Lecturers of teachers' training' Colleges Support Staff	Project Director Project Co-ordinator Professors, Lecturers, & other PE experts Staff of Training College Support staff	Project Director Project Co-ordinator Professors, Lecturers, & other PE experts Staff of Training College Support staff
Facilities	Library	Library	School building and paraphernalia Library Furniture
Equipment/Material	TV, Radio, etc. Audio-Cassettes Developed & printed lessons & answer sheets Reference books Charts, posters, etc.	TV, Radio, etc. Modules Reference books	Video Audio tapes Relevant literature Reference books Charts, posters, slides, films & other AV materials
Other Inputs	Postage & stationery	Postage & stationery	Transportation Subsistence Allowance Refreshment
Client Inputs	Extra time	Extra time	Release Time

There are also some intangible costs, such as any inconvenience suffered by the trainee and his family members during the training period. All such "inconveniences" are costs which should be appropriately covered in calculating the costs.

Another typical breakdown of costs, includes the following components: personnel, facilities, equipment and materials, other programme inputs, and client inputs.

Facilities refer to spaces, areas and buildings. Equipment and materials refer to furniture, equipment/apparatus, and supplies needed for the intervention. Other inputs include extra liability or theft insurance, or cost of special training. Client inputs include contributions that are required of the clients or their families.

While a budget provides estimates of some of the above costs, it is often inadequate for purposes of cost analysis. First, the budget does not include cost information on all the ingredients that are used in an intervention. Contributed resources such as volunteers,

donated equipment, and other unpaid inputs, as well as resources which are already paid for, are also not included. Sometimes a budget distorts the true cost of an ingredient. The costs of any particular intervention in a budget that covers a much larger unit of operation may be difficult to isolate. Because budgets represent plans on resource allocation rather than actual expenditures, they cannot serve as the basis for constructing cost estimates but only as a supplementary source of information.

Analyzing Cost

The analysis of various ingredients of cost can be based on the different categories of costs: a) fixed and variable, b) tangible and intangible costs, c) who bears them.

A three-demensional presentation of these is shown in Figure 1 below:

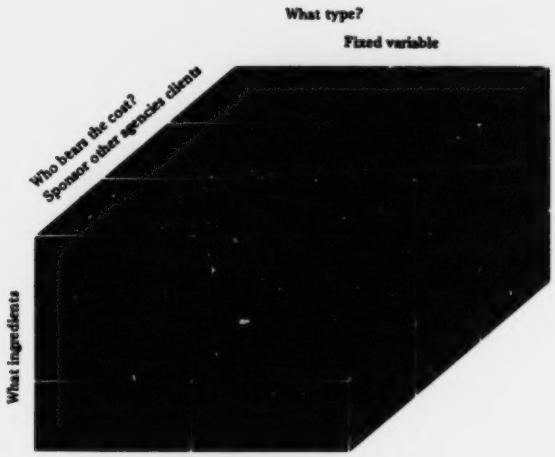


Figure 1. A 3-dimensional classification of costs

After the ingredients have been identified and their cost estimated, a cost worksheet can be set up to analyze the cost. This is a grid which separates costs either by ingredient, or as fixed or variable costs, in terms of the constituencies which bear the cost, as for example, sponsor, government agencies, and contributors. Chart 2.2 shows a sample cost worksheet.

Chart 2.2. A Grid for Estimating and Distributing Costs

Ingredient	*Total Cost*	*Cost to Sponsor*	*Cost to other Gov't Agencies*
Fixed Costs Personnel Facilities Materials & equipment **Variable costs** Trainees' time & inputs Other inputs			
Total ingredients Cost			
Trainee fees			
Net Cost			

This worksheet serves two purposes: to determine the total ingredient cost for an intervention, and to show how the cost of each proposed or actual intervention is distributed over different constituencies.

Chart 2.3 shows a sample worksheet accomplished for a hypothetical training modality.

Chart 2.3. A Sample Cost Estimate Sheet for a Hypothetical Training Modality in a Country

Ingredient	*Total Cost US$*	*Cost to Sponsor*	*Cost to other Gov't Agencies*	*Contributed/ Private Inputs*
Personnel				
Training Specialist	350	350		
Module Writers (3)	400	250	150	
Resource Persons	100	50	30	20
Adm Staff (2)	200	190	10	
Video/Audio Technicians	100	100		
Facilities				
Rooms/A-V Centre	200	160	20	20
Maintenance (energy, utilities, etc.)	100	100		
Equipment & Materials				
Print Materials	220	200	20	
Module Development	430	390		40
Supplies	100	90	–	10
Other Inputs				
Subsistence Allowance	1 000	200	800	
Accommodation	150		150	
Transportation	50		50	
Official Release Time	200		200	
Total Ingredient Cost	3 600	2 080	1 430	90

No. of teachers trained = 750

Some issues arise at this point. How can costs be estimated when there is no information on costs, or when there are different cost estimates?

To deal with the first question, the activity to be costed out is reckoned in terms of sub-ingredients needed to produce the activity, rather costing out the whole activity in abstract terms.

When there are different cost estimates, it is advisable to obtain their ranges and variation. The medium value, that is the mid-point between the highest and the lowest estimates, can be taken as the most probable one.

A cost analysis must always be referenced to a time period, that is, cost benefits and effects of any intervention are considered with reference to a particular period of time.

A confusion that sometimes arises is the difficulty of separating the ingredients of a specific intervention from the ingredients required for the more general programme that contains the intervention. In such cases, the ingredients that should be evaluated for the purpose of a cost analysis should include only those additional ones that are required for the intervention, or the marginal cost.

For the cost effectiveness component therefore the steps are:

1) Identifying the ingredients required for each alternative,
2) Estimating/setting the cost of each ingredient,

3) Identifying who or which agency bears the cost,

4) Calculating the total cost for each alternative,

5) Obtaining the measure of effectiveness of each alternative,

6) Computing a cost effectiveness ratio for each alternative.

Chart 2.4 shows the costs of three hypothetical training modalities for one year. Details of the process of computing the cost-effectiveness ratios for these modalities are discussed in Chapter Four.

Chart 2.4. Costs of Three Hypothetical Training Modalities

Ingredient		*A*	*B*	*C*
Fixed Cost	Personnel	$ 360	$ 300	$ 2 600
	Facilities	40	15	
Variable Cost	Materials	600	330	250
	Supplies	30	15	500
	Equipment	45	15	500
Other Inputs	(Transport, maintenance, postage, etc.)	180	120	1 750
Client Inputs		20	15	800
Total Cost		$ 1 275	$ 810	$ 6 100
No. of teachers trained		60	90	200
Cost per trainee		$ 21.75	$ 90	$ 30.50

Efficiency

The efficiency of a modality refers to how much it can turn out relative to the inputs. For example, given three modalities each earmarked a certain sum. The modality which results in a greater output is the more efficient. This concept is illustrated in Chapter Four.

CHAPTER THREE

Design and Instrumentation

Design is a plan or framework set up for a particular purpose. In evaluation research, the purpose of design is to enable the evaluator to answer the evaluation question and to control variance.

Evaluative research designs may be categorized into three groups: pre-experimental (non-experimental), experimental, and quasi-experimental. The designs of descriptive survey research are sometimes used for descriptive evaluation purposes. The pre-experimental designs are mainly for one-sample studies in which randomization is not used. Where a comparison group is used, no strict assumptions are made about its comparability to the sample which received the treatment or intervention.

For a design to be considered a true experimental design, it must satisfy these two criteria: at least two groups are studied, and random selection of subjects to groups and to treatments is done.

The quasi-experimental designs, on the other hand, fail to meet the criterion of randomization. Except for the time series design, which may be done on just one sample measured repeatedly over time (hence, it is used as its own control group), most quasi-experimental studies use at least two groups.

Four evaluation designs which lend themselves to an incorporation of cost analysis are the following:

1. The Two-group, Post-test Design

This is a study of two groups given different interventions or treatments. At the end of the treatment an observation measure (post-test) is taken. The design is represented in the following symbols:

Treatment	*Post Test*
X_1	O_1
X_2	O_2

Here X_1 and X_2 stand for two training modalities. O_1 and O_2 refer to scores of the treatment groups in a knowledge test or an attitude inventory. If O_1 differs from O_2, it is suggested that the two treatments differ in their effects/effectiveness, as measured by a common instrument.

2. Two-Group Pre-test/Post-test Design

In the previous design, it cannot be ascertained if the observed difference between the two groups is really due to the treatment, as there is no available measure of the groups' abilities/attitudes prior to the training. Hence, it is possible that the groups differ in the post-test simply because they were different, to start with.

The pre-test post-test two-group design is represented this way:

O_1	X_1	O_2
O_3	X_2	O_4

This design allows a comparison of the characteristics of the two groups at entry level. If they are comparable at the start, then the effectiveness of the two modalities or treatments can be compared based on the post-test measures (O_2 vs O_4). If O_1 differs from O_3 significantly, then a statistical control for the initial edge of one group can be applied in comparing the two post-test measures.

3. Multiple-group post-test design

This is represented thus:

Strategy/Intervention	*Post-test*
X_1	O_1
X_2	O_2
X_3	O_3
X_4	O_4

The groups are compared on the basis of the post-training measures (the Os). Any significant differences among these measures are attributed to the treatments or modalities (the Xs), and are interpreted as differences in effectiveness. The groups given the treatments are assumed to be comparable at the start.

4. Multi-group, Immediate and Delayed Post-test

Strategy	*Post-Test*	*Delayed Post-Test*
X_1	$O_{1\,1}$	$O_{1\,2}$
X_2	$O_{2\,1}$	$O_{2\,2}$
X_3	$O_{3\,1}$	$O_{3\,2}$

This design works with three or more groups. The Xs stand for the treatments or training modalities whose effects are measured immediately after the training and again, say six months later, in a follow-up study. The delayed post-test could give a measure of the retention of knowledge or the application of the knowledge or skills learned in the training programme to the trainee's work situation.

Since randomization in training programmes is not always possible to implement, quasi-experimental designs are considered most feasible and appropriate. However, this does not suggest precluding the use of strictly controlled experimental designs.

The assessment of effectiveness can be done formatively or summatively; that is, during the operation or at the end of the training programme.

Cost Effectiveness Approach

This builds on rather standard approaches to evaluation by simply adding a cost dimension to the over-all evaluation design. Thus, if an evaluation of the effectiveness of different alternatives is to be undertaken, it is necessary to provide a framework for incorporating the cost analysis in the evaluation.

In the CE approach, the outcome can be addressed according to its own attributes rather than based on monetary units. The ratio of cost to the effectiveness data will indicate the level of effectiveness that can be obtained from an estimated cost. Since the ratios for

different alternatives can be compared, information can be provided to decision makers on which alternatives seem best in terms of costs, other factors remaining constant.

Cautions about CE

When CE analysis is integrated into evaluations, the evaluation exercise is more likely to yield the types of information that are crucial to decisions, than when costs are ignored.

It should be stressed, however, that CE as an analytic tool is only a source of information rather than decisions. Even the best analyses must be combined with other types of information in order to make good decisions. The decision-maker is reminded of the following points:

1) Measures of costs and effects are really only estimates of these dimensions, hence they are subject to error. Their accuracy depends on the evaluator's ability to measure the cost or effectiveness concept in an accurate way.

2) It is not possible to incorporate all of the considerations that should form the final decision. There are always considerations that cannot be fully incorporated into the evaluation. The implication is that if differences in CE results for two or more alternatives are small, the decision should be made on the basis of other criteria rather than on comparisons of numerical ratios. As a general rule, ratio differences of 10 per cent or so should always be treated with skepticism as such differences could be due to a margin of error.

It is important to incorporate cost analysis into the evaluation design itself rather than to decide upon the collection of cost data as an after thought. It is much easier to obtain accurate cost estimates when analytic procedures are built into the evaluation design, than it is to collect them later on a post-hoc basis. The former makes it possible to account more fully for the resource ingredients that are incorporated into each alternative during the actual evaluation.

Instrumentation

Instrumentation encompasses the use of instruments by which data or information can be collected and quantified.

An *instrument* is a device used for a specific function or purpose. In evaluative research, instruments include achievement tests, rating scales, checklists, or performance scales which are all aimed at assessing the effects of an intervention. Instrumentation therefore connotes data collection and measurement.

To measure the effects of the three training modalities identified in this paper, three instruments will be needed to obtain information on effectiveness. They are:

1) a test of knowledge of population education concepts,
2) an attitude rating scale, and
3) a behaviour tendency scale.

The Knowledge Test

The test to measure gain in knowledge can be a multiple choice test consisting of 40 to 50 items, each provided with four response options.

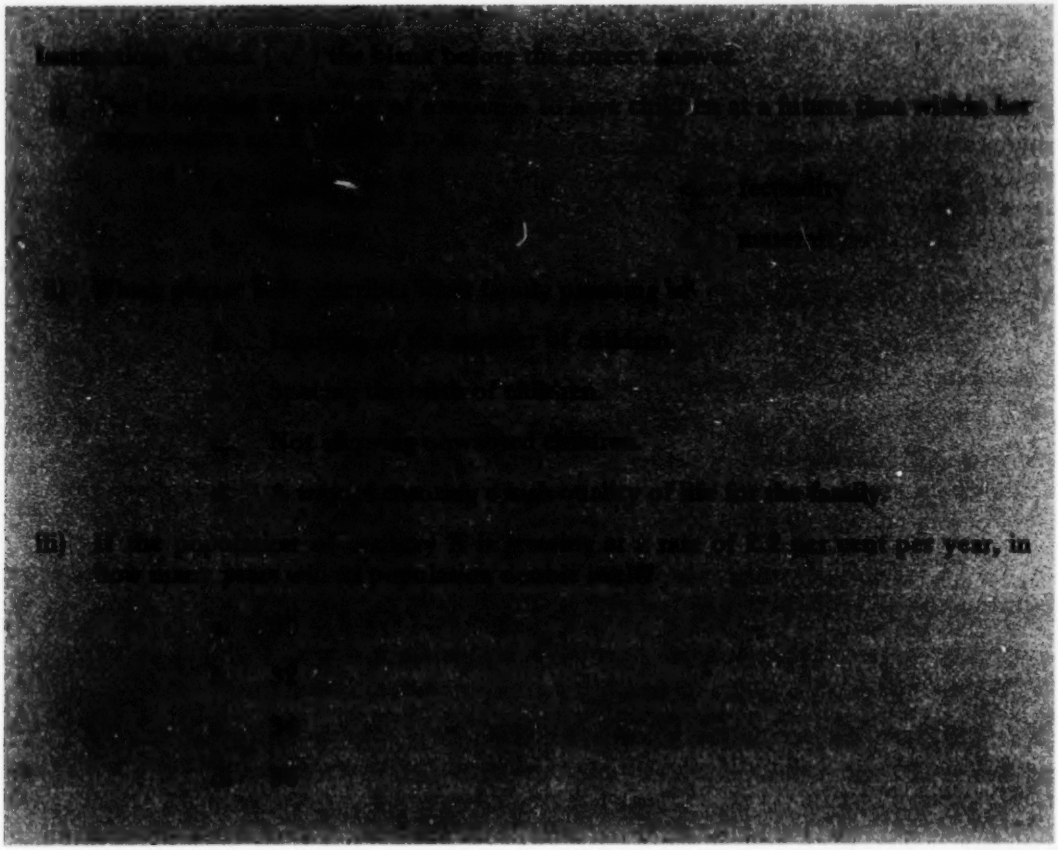
The knowledge test covers concepts involved in nine population education themes or thrusts as follows:

1) small family size and family welfare,
2) delayed marriage,

3) responsible parenthood and family planning,
4) population and other development concerns,
5) population beliefs and values,
6) urbanization and migration,
7) problems of adolescence; sex education,
8) aging and
9) status of women.

To ensure the content validity of the test, there should be at least three items for each thrust. The composite score on the test indicates the respondents' knowledgeability about population education. The higher the score, the more knowledgeable the respondent is. Sub-scores on each of the nine components may be analyzed later to find out which thrusts or messages have not been learned well.

Below are three sample multiple choice items from a knowledge test. In Chapter Six there is a prototype test consisting of items dealing with the nine population education thrusts:



The test can be given as a pre-test and post-test to determine gain in knowledge that can be attributed to the training or intervention. It can also be administered as a post-test only.

A trainee's score on a 40-item test, for example, is a measure of the extent of his knowledge of population education concepts.

There are many tests from which the trainer can draw. Among them are sample tests found in the following books:

1) Unesco ROEAP. *Evaluative Research in Population Education*, 1986.
2) Unesco ROEAP. *Manual on Evaluation in Population Education*, 1979.

Attitude Rating Scale

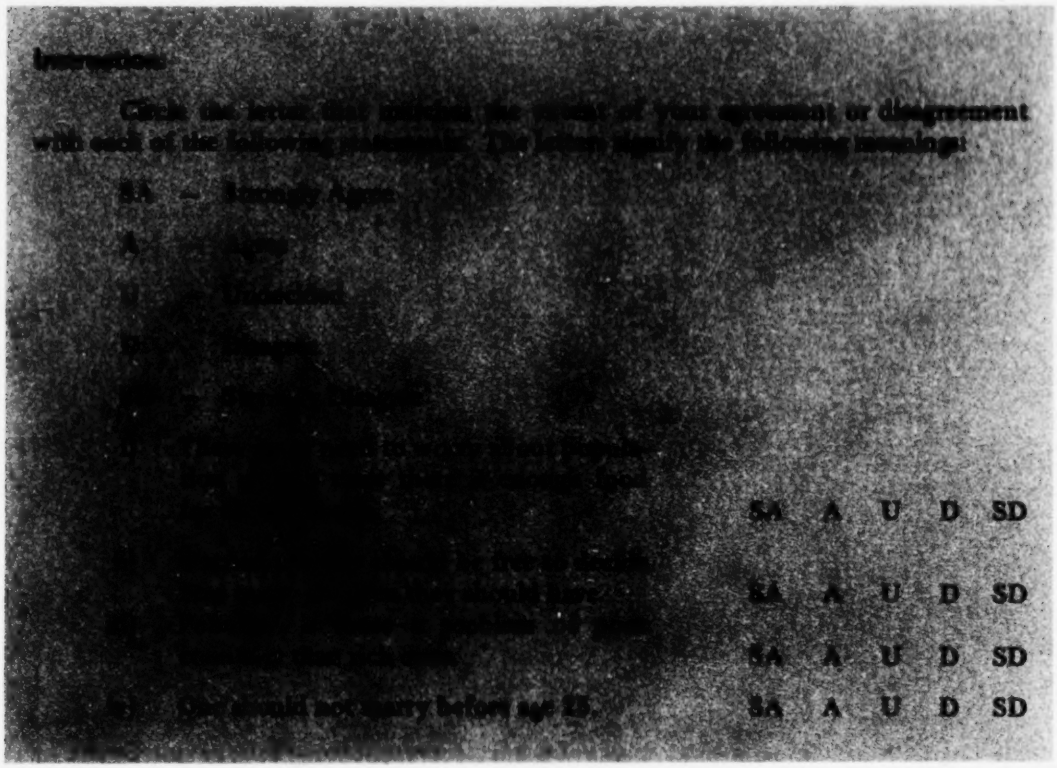
This scale can be a 20-to 30-item instrument using Likert -type items, which are opinionated statements that require the respondent to register his agreement or disagreement. There are no right or wrong responses. The instrument is designed to gauge the respondent's attitudes toward such themes as:

1) small family size,
2) age at marriage,
3) equality of the sexes,
4) care and respect for the elderly,
5) changing role of women, and
6) sex preferred for the first child.

Each response to an item has a score weight. The scores from the items are added up.

The higher the respondent's total score, the more favourable is his attitude toward population education messages and themes. Agreeing with positively oriented statements and disagreeing with negatively oriented ones indicate a favourable attitude.

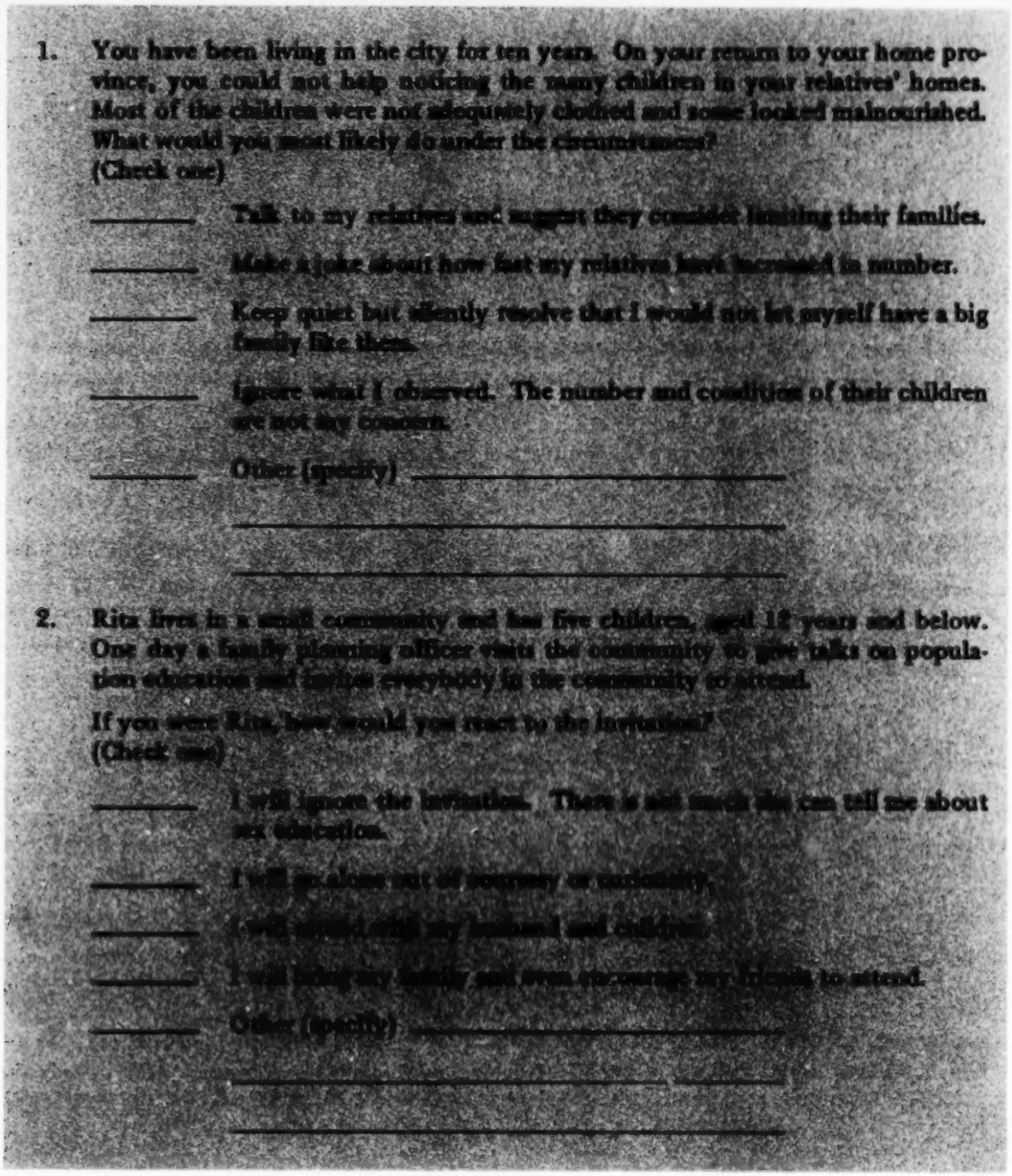
Below are sample items from an attitude rating scale. A sample attitude test is found in Chapter Six.



The attitude scale can be administered at the end of a training programme, to get an index of the trainees' attitude, or at the start and end of the training programme to get a measure of attitude change ascribable to the training.

Behaviour-Tendency Scale

Since observation of behaviour is not always feasible, an indirect measure of behaviour or behaviour tendency can be obtained through situation-test items to which an individual registers how he will most likely act in a given situation. Each response option to an item has a corresponding score weight. The total score of an individual on all the items is a surrogate measure for his behaviour or tendency to act or behave. Two situation test items are given below:



1. You have been living in the city for ten years. On your return to your home province, you could not help noticing the many children in your relatives' homes. Most of the children were not adequately clothed and some looked malnourished. What would you most likely do under the circumstances?
(Check one)

_____ Talk to my relatives and suggest they consider limiting their families.

_____ Make a joke about how fast my relatives have increased in number.

_____ Keep quiet but silently resolve that I would not let myself have a big family like them.

_____ Ignore what I observed. The number and condition of their children are not my concern.

_____ Other (specify) _____

_____

_____

2. Rita lives in a small community and has five children, aged 12 years and below. One day a family planning officer visits the community to give talks on population education and invites everybody in the community to attend.

If you were Rita, how would you react to the invitation?
(Check one)

_____ I will ignore the invitation. There is not much she can tell me about sex education.

_____ I will go alone out of courtesy or curiosity.

_____ I will attend with my husband and children.

_____ I will bring my family and even encourage my friends to attend.

_____ Other (specify) _____

_____

_____

Situation- test items like the above also reflect attitudes and/or values. A sample situation-test for obtaining a measure of behaviour tendency is found in Chapter Seven.

CHAPTER FOUR

Data Analysis and Interpretation

Two sets of analysis need to be done. The first set is an analysis of the effects of the modalities as specified in the evaluation design. The second set is an analysis of cost effectiveness. In the two- or three- group design using only post-test scores, the typical performance of individuals in each group can be measured by computing the mean or average scores and the standard deviations.

In designs with both pre-test and post-test scores, a mean change/gain score is computed by obtaining the difference between the post-test and pre-test scores of each individual, and dividing the sum of these scores by the number of individuals, that is:

$$\text{Mean Gain} = \frac{\text{Sum of all individuals' gains}}{\text{No. of Individuals}}$$

$$\text{or } M = \frac{\Sigma\ (\text{Post-test Score} - \text{Pre-test Score})}{N}$$

The mean gain scores of the groups are then compared.

Chart 4.1 shows a table of hypothetical scores from three training modalities A, B and C. The arithmetic means are computed on the assumption that the knowledge scores are interval scale variables. Instead of mean score, the medium score (or the mid-point between the highest and the lowest scores) can be used as the average score, especially when the distribution of the scores is not normal or when the level of measurement is ordinal, not interval.

The sums of the pre-test, post-test, and gain scores are shown together with their corresponding mean scores.

Statistical tests of differences may be applied to determine whether the numerical differences are real or are chance variations only.

When experimental designs are used (that is, when randomization is applied in the selection of members into a sample and the assignment of samples to treatments), parametric statistical tests can be applied. The reader is referred to elementary statistics books for information on the t-test, z-test or F-test of mean scores[1].

When randomization is not applied and when sample sizes are small, non-parametric tests of difference are recommended to determine whether the differences between the two or three sets of scores are due to chance only, or not. For these purposes, the Sign Test, the Fisher's Probability Test, the Mann-Whitney Test, and the Kruskal-Wallis Test might be

[1] A comprehensive description and explanation of statistical techniques for evaluation studies is found in *Evaluative Research in Population Education*, Chapter 4 (Unesco, Bangkok) 1986.

Chart 4.1. Hypothetical Pre-test, Post-test and Gain Scores on Knowledge from Three Training Modalities

Individual	*Modality A*			*Modality B*			*Modality C*		
	Pre	*Post*	*Gain*	*Pre*	*Post*	*Gain*	*Pre*	*Post*	*Gain*
a	1	12	11	0	4	4	3	10	7
b	3	9	6	1	5	4	2	12	10
c	4	15	11	4	7	3	5	7	2
d	7	20	13	2	8	6	1	14	13
e	2	14	12	2	5	3	4	15	11
f	0	14	14	4	7	3	2	10	8
g	4	11	7	3	8	5	4	7	3
h	1	15	14	1	5	4	4	9	5
i	3	16	13	1	6	5	0	8	8
j	10	9	−1	3	6	3	1	7	6
k	3	19	16	1	7	6	0	10	10
l	2	15	13	4	10	6	4	12	8
m	4	14	10	1	5	4	5	15	10
n	8	19	11	3	6	3	4	13	9
o	5	12	7	2	8	6	2	12	10
p	5	18	13	1	4	3			
q	1	13	12	2	5	3			
r	2	10	8	2	6	4			
s	0	12	12	5	7	2			
t	2	10	8	4	8	4			
u				1	9	8			
v				2	10	8			
w				3	7	4			
x				1	3	2			
y				3	10	7			
No. of Individuals	(20)			(25)			(15)		
Sum of scores	67	277	210	56	166	110	41	161	120
Mean Score	3.35	13.35	10.5	2.24	6.64	4.40	2.73	10.73	8.00

appropriate. The reader is advised to refer to such books as Sidney Siegel's *Non-Parametric Statistics for Behavioural Sciences* (1956) for details about these tests.

The second set of analysis studies costs in relation to the effects of the treatments being compared.

Analysis of Cost Effectiveness

Once the total cost of all the ingredients has been computed for each of the alternatives being compared, the cost per client is computed and a ratio between the cost and the corresponding effect is calculated.

Taking "gain in knowledge" as the indicator of effectiveness in the three training modalities, the mean cost per trainee is divided by the mean gain score to obtain the C/E index.

Table 4.1 shows hypothetical data for the three training modalities A,B,C, using the following indices of effectiveness:

1. *Knowledge gain* as measured by the difference between scores on the same knowledge test given before and after the training.

2. *Attitude change* as measured by the difference between the post-training and the pre-training score on an attitude inventory scale.
3. *Behaviour tendency* as measured by the score on a paper-and-pencil situation test on how a person will likely act in a given situation.

The table shows the total cost for one year and the cost per trainee for each of the modalities costed in Chart 4.4 p. 61.

Table 4.1. Cost per Trainee for Each of Three Training Modalities

Modality	*Total Cost*	*No. of Trainees*	*Cost per Trainee*
A	$ 1 275	60	$ 21.25
B	810	90	90.00
C	6 100	200	30.50

On a per trainee basis, modality B has the highest cost and modality A the lowest cost.

Table 4.2 presents hypothetical mean gain scores on the three indices of effectiveness for the three training modalities, based on the data in Chart 4.1. As indicated in this table, modality A has the highest mean score for knowledge gain and the second largest score for behaviour tendency. Modality B has the lowest score for mean gain in knowledge as well as for attitude change. Modality C has the highest score for attitude change.

Table 4.2. Hypothetical Mean Gain Scores on Three Indices of Effectiveness for Three Training Modalities

Modality	*Index of Effectiveness*		
	Knowledge Gain	*Attitude*	*Behaviour Tendency*
A	10.5	12	8
B	4.4	6	5
C	8.0	16	10

Table 4.3 presents the cost effectiveness results for the three modalities, using the knowledge gain score as the effectiveness measure. The C/E ratios are obtained by dividing the cost per trainee by the index of effectiveness (in this case, knowledge gain).

Table 4.3. Hypothetical Cost Effectiveness Results for Knowledge Gain in Three Training Modalities

Modality	*Cost per Trainee*	*Effectiveness (Knowledge Gain)*	*C/E*
A	$ 21.48	10.5	$ 2.01
B	90.00	4.4	20.46
C	30.50	8.0	3.81

Modality A shows the lowest ratio of cost to effectiveness, the lowest cost per trainee, and the highest effectiveness index for knowledge gain. On the average, the cost per trainee for 1 point of improvement in knowledge is about $ 2.01.

On the other hand, modality B entails the highest cost per trainee and is the least cost effective of the three modalities. It yields the lowest gain while incurring the highest cost per unit gain.

The figures suggest that modality B takes ten times as much money to effect the same knowledge gain as modality A, and is about six times as costly to run as modality C in order to effect one point of improvement in knowledge.

Modality C has the second highest cost per trainee and is the second most cost effective.

Table 4.4 shows the cost effectiveness ratios of the three modalities for each of the three indices of effectiveness. The C/E ratios and computed from the data in Tables 4.1 and 4.2.

Table 4.4. Cost Effectiveness Results by Modality Based on the Three Indices of Effectiveness

Modality	*C/E Ratio Per Index of Effectiveness*		
	Knowledge	*Attitude*	*Behaviour Tendency*
A	2.01	1.77	2.65
B	20.46	15.00	18.00
C	3.81	1.88	3.05

Interpretation of Results

Some cost analysts prefer to use the "effectiveness cost" ratio, that is, the effectiveness measure divided by the cost incurred to bring about the effect. This is analogous to the "output over input" concept. The ratio generally comes out as a decimal less than 1.00.

The cost effectiveness ratios in this paper are mostly greater than 1.00 because the cost measures are generally greater than the effect measure. The greater the C/E result, the less cost effective a modality is. The lower the C/E ratio of a modality, the more cost effective it is.

In Table 4.4 we note that modality B has the lowest cost-to-effectiveness ratios for the attitude change and behaviour tendency indices. Consequently, modality B is the least cost effective (that is the most costly) on all the three effectiveness indicators.

Hypothetical data in Tables 1 to 4 indicate modality A is better than either B or C on all the three indicators of effectiveness.

Efficiency and Effectiveness

In evaluating the effectiveness of training modalities, efficiency must not be overlooked. Some modalities facilitate the training of more teachers in the same unit at the same time, than other modalities. Other modalities are meant to train a few teachers only, but more intensively than other modalities can. Hence, two factors have to be considered: *coverage* and *intensity* of training.

Let us assume that three training modalities are being evaluated. Each has a target of 1000 teachers to be trained and the results are as follows:

Modality	*No. of teachers*		*Effectiveness Index (Coverage)*
	To be trained	*Actually trained*	
A	1 000	600	60%
B	1 000	800	80%
C	1 000	1 000	100%

Hence in terms of breadth of coverage, modality C is the most effective since it was able to meet 100 per cent of the target number to be trained. Modality A is the least effective in coverage, having trained only 60 per cent. Here our main index of effectiveness is coverage. This is usually the primary consideration in training programmes aimed at training or developing large numbers of teachers in the shortest possible time.

Looking into the number of trained teachers meeting a criterion of effectiveness (as for example, a passing score on a test, ability to apply what was learned, or being actually assigned to teach what was learned), the intensity index for effectiveness is computed by dividing the number of teachers who met the criterion by the number trained, as shown below:

Modality	*Number of Teachers Trained*	*Number who met the criterion*	*Effectiveness Index*	
			Based on the Teachers trained	*Based on the targetted number*
A	600	400	.67	.40
B	800	600	.75	.60
C	1 000	500	.50	.50

This time we see that modality B is the most effective and modality C is the least effective, based on the number of teachers trained to the criterion level. On the other hand, a comparison between the number of teachers trained to the success criterion and the targetted number of teachers to be trained (1000), shows that modality C is better than modality A. (.50 is better than .40).

Considering both indices of effectiveness, modality B yields the best results.

To find out the efficiency of the modalities, the costs incurred must be considered.

Cost efficiency is determined by dividing the cost by the indices of effectiveness, that is, the number of teachers actually trained, and the number of trained teachers who meet the success criterion. This is shown in the table below, using the hypothetical data that $ 15000 has been earmarked for training 1000 teachers by each of the three modalities.

Modality	*Amount Spent**	*Number Trained*	*Cost per Trainee*	*No. of successful Trainees*	*Cost per Successful Trainee*
A	1 000	600	$ 15.00	400	$ 22.50
B	10 000	800	12.50	600	16.67
C	13 000	1 000	13.00	500	26.00

The costs per trained teacher across the three modalities do not vary much. They range from $ 12.50 to $ 15.00. Modality B incurs the least cost, and modality A the highest cost. In terms of cost per trainee who meets the criterion level, modality B is clearly the most cost efficient.

Standard and Actual Cost Effectiveness Ratios

In the planning of a project or intervention, the project manager cites budget or estimated costs and expected results. These are later compared to the actual cost of run-

ning the project and the actual observed effectiveness. The budgeted cost divided by the expected effects is referred to as the standard cost effectiveness ratio. On the other hand, the ratio of the actual expenditures to the observed/measured effects is the actual cost effectiveness ratio.

These concepts are illustrated further in Chapter Five (See Formats 4, 5, 6 & 7).

Guidelines for Using Cost Effectiveness Data

The CE approach is natural for educational and training evaluations because it lends itself readily to traditional evaluation approaches and to the types of outcomes that are often considered in decision making. One should carefully study CE analysis, however, to be able to use it to advantage.

Levin (1983) lists these questions as a checklist for evaluating cost analysis reports:

1) What is the decision framework?
2) Which alternatives are evaluated?
3) How are costs estimated?
4) Are the costs evaluated according to who pays them?
5) Are costs presented in an appropriate mode, given the nature of context and setting?
6) Is the criterion of effectiveness appropriate to the analysis?
7) Does the analysis of results meet the overall standards for assessing effectiveness?
8) Are the cost effectiveness comparisons appropriate?
9) How generalizable are the results to other settings?

CHAPTER FIVE

Managerial Considerations in Cost Effectiveness Study

Understanding Managerial Dimensions

The population programme management has to decide on how various tasks/sub-tasks and associated activities should be planned, organized, executed, monitored, and evaluated within a given budget. It has to decide what institutions/organizations are to be involved in the programme, at various levels and for certain activities, and how to co-ordinate these activities. Again, at various levels of operations decisions are required in planning and organizing sub-tasks and associated activities.

It follows that understanding a modality will require a thorough study of these internal aspects of the programme management process. Since different modalities will require different managerial structures and degrees of competence and efforts, while also having different cost centres and cost structures, it will be necessary to (i) study the entire management structure and process, (ii) identify discrete tasks and sub-tasks, (iii) consider levels of operations, and (iv) ascertain cost centres and cost structures.

In addition to the above, the cost effectiveness study has to take into account the contextual setting. This covers external factors that are being implemented, and which may indirectly affect various operations.

Thus, we have to note that:

1) Effectiveness of training depends on the synergic relationship and collaboration among the three major partners of training namely, participants (trainees), training organizations and trainers. Hence, an evaluation should provide the necessary feedback on all these matters.
2) Training effectiveness depends not only on what happens during training but also on what happens before the actual training (pre-training factors) and what happens after the training has formally ended (post-training factors). Evaluation cannot neglect these important contextual factors.
3) Various aspects of the training process which are not direct training inputs contribute to its effectiveness. Evaluation should, therefore, also focus on these factors.
4) The focus or the main task of evaluation should not only be in the nature of auditing (measuring training outcomes in terms of what has been achieved and how much), but should also be *diagnostic* (why has the cost effectiveness been low or high), and remedial (how can effectiveness be raised with some cost factors)[1].

[1] See Udai Pareek, "Evaluation of Training", *Vikalpa*, Vol. 3, No. 4, October 1978, P. 291.

The diagnostic and remedial aspect of cost effectiveness is of utmost importance. The goal is not to obtain the cost effectiveness ratio *per se*, but, with the help of this ratio, to find ways of improving effectiveness with the efficient use of given resources (cost factors).

The cost effectiveness ratio (that is, cost divided by effectiveness) can be changed either by reducing cost or by increasing the effectiveness, or both, and since a population education programme has many components, each operating as a cost centre and having a cost structure (fixed and variable cost, opportunity cost, marginal cost, and so on), the cost reduction can take place at various component levels. Similarly, since training involves various levels, which are hierarchically and/or horizontally linked, the degree of effectiveness at one level often determines the degree of effectiveness at other levels. Hence, overall effectiveness can be improved by improving effectiveness at various levels.

Thus, we have to ask these questions:

1) Are the costs at various levels of operations reasonable? Can the costs at various levels be reduced by avoiding wastage, if any, and/or by carrying out alternate actions, without reducing effectiveness?
2) Can effectiveness at various levels of operation be improved by better planning and organization of activities, and/or using alternate methods and instruments, without increasing the costs?

It follows that the design of a cost effectiveness study must be able to provide data and analysis on all the above issues.

Some Managerial Aspects

The following areas are generally considered in identifying managerial-related issues:

1) Inputs of personnel
2) Financial inputs
3) Equipment and materials
4) Instructional and training materials
5) Inter- and intra-institute/organization co-ordination

These are briefly discussed below:

Inputs of Personnel

The population education programme of a country specifies the inputs required of the personnel to implement the programme, as well as the period and duration of their appointments. Any departures from the plan is likely to affect the effectiveness of the programme. Hence, it must be ascertained whether the specified number of personnel with relevant background, experience, and qualifications were posted in time at various levels of operations, and if not, to what extent this was not carried out and how did the deviations affect the performance of the programme.

Financial Aspects

Each programme plan designates funds allocations under specific headings and for specific tasks. Any delay in the provision of funds will delay the task and consequently all other related tasks and activities. Delays result in increased cost and reduced effectiveness. Hence, it must be established whether the amounts earmarked for various items of expenditure were released in full and at the time specified in the plan, and if not, what was the reason for the delay/reduction, and how did the deviations affect the performance of the programme.

A related question is whether the project management staff at central and other levels spent the money according to the plan, and if not, what were the reasons, and how did the deviations affect the performance of the programme.

Equipment and Materials

Details of equipment and materials are generally listed at the planning stage. It must be ascertained whether the equipment and materials, according to indicated specifications, and quality, and quantity, were procured and made available to the operating units/users in time. A second question is whether proper arrangements for the training of personnel in the use of equipments, as well as for maintenance services, were made. Any weakness on these fronts is likely to affect the effectiveness of the programme. Hence, it must be established how a weakness on these fronts, if any, affected the performance of the programme.

Instructional and Training Materials

The programme plan provides for the preparation of instructional and training materials for teachers' trainers and teachers, and instructional materials for learners and out-of-school educational personnel, such as those in non-formal education. It must be determined whether the materials were prepared, reviewed, field-tested, revised, and made available at the right time and in the required quantity to the intended users.

In case of certain training modalities, where feedback or other advisory systems supplement the training modality, a further question is whether the feedback and advisory systems worked in time to the expected degree of performance. If not, to what extent did it fail to do so and with what consequences?

Inter- and Intra-Institute/Organization Co-ordination

Most of the models discussed in Chapter 1 involve the participation of many institutions/organizations. The overall effectiveness of the programme depends upon the degree of performance of each participating institution. Since tasks given to different institutions are linked and inter-related, any weakness in the performance of one (in terms of quality, quantity, and punctuality) is likely to affect the performance of others, and consequently of the entire programme. It must be asked whether there were any weaknesses in the co-ordination of activities of the participating organizations, and if so, to what extent was this weak and how did this affect the overall performance of the programme. The question of co-ordination will also be relevant in relation to an organization where various departments are involved in inter-related activities.

It can be seen from the above that these five management related issues will individually and interactively determine the physical and intellectual climate in which the programme will be executed, and its level of effectiveness.

Model for Identifying Management Structure

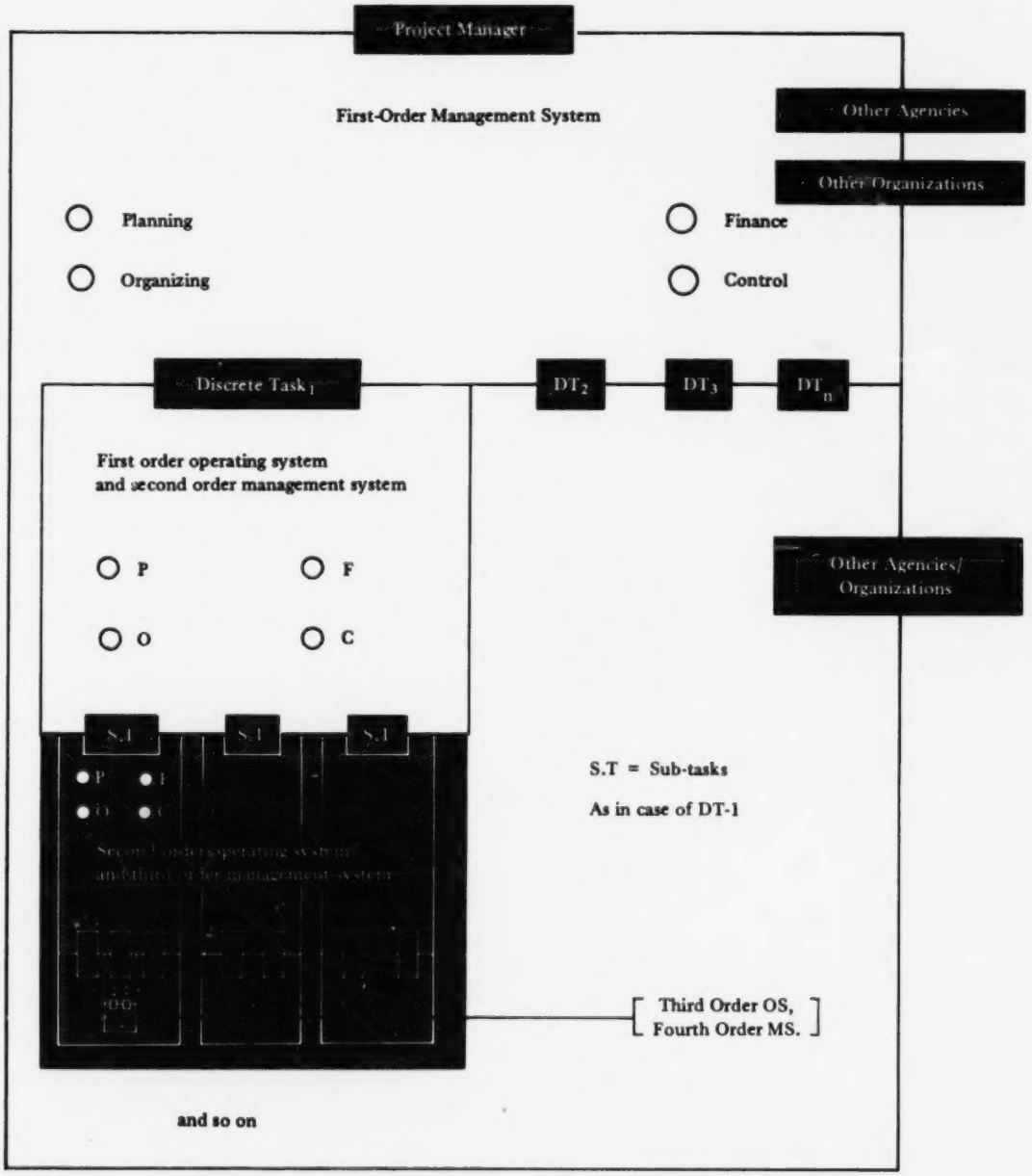
To understand the overall management structure and identify discrete tasks and sub-tasks, levels of operation, cost centres, and cost structures, the model that is generally followed is discussed here.

A programme has specific objectives which can be achieved through the performance of various tasks and functions. The top management's primary function is overall planning, organizing, financing and control of various tasks, in a co-ordinated manner. This is first-order management system. For each discrete task there is an operating system by which to achieve it. Since each task involves a number of sub-tasks, the operating system will also be responsible for planning, organizing, and monitoring the sub-tasks in a co-ordinated manner. Thus this operating system is a second-order management system. As each sub-task can be

further divided into discrete tasks, a second-order operating system also be, a th d-order management system. By logically dividing work into discrete tasks, a hierarchy of management and operating systems is arrived at.

It should be noted that each management/operating unit has a clearly defined *primary task* to perform effectively and efficiently. Any weakness in the achievement of the primary task will affect the performance of other units, as well as the overall performance. The primary task is generally defined as that task on which the "survival" of the unit depends. In other words, the unit exists only to achieve the primary task. If it cannot achieve the primary task assigned to it, it has no right to exist.

The model that emerges from the above is presented in Figure 1.



This model will help in analysing various management and operating systems in relation to various training models discussed in Chapter 1. Once the training models are

analysed on these lines, it will be easy to identify the centres involved in direct training activities and those involved in supportive/service functions. The effectiveness of each unit/centre level can be measured in relation to the task assigned to it and the cost incurred.

Guidelines for Studying Management Issues

Guideline 1. Identifying Division of Work and Responsibility

Using the model given in Figure 1, the following are identified for a given training modality.

(i) All tasks and sub-tasks, in such a way that *all* activities involved in the programme are fully accounted for;

(ii) The primary task at each management and operating level, as well as the institutions/organizations involved in the programme;

(iii) Planned allocation of personnel and those actually posted at each unit level. Was a specific number of personnel with relevant background, experience, and qualifications posted in time at each unit level?. If not, give the reasons, the degree of deviation, and the effect on the performance (refer to Format 1, 2 and 3);

(iv) Planned allocation of funds and the amount actually provided at each unit level. Were various items of expenditure released without reductions and at the specified time? If not, give the reasons, the degree of deviation, and the effect on the performance (refer to Format 1, 2 and 3);

(v) Planned allocation of equipment and materials and actual supply to each unit. Were the equipment and materials, according to pre-determined specifications, quality, and quantity, procured and made available to the operating units/users in time? If not, state the reasons, the degree of deviation, and the effect on the performance (refer to Format 1, 2 and 3);

(vi) Arrangements for maintenance, repairs, replacement of equipment and materials, and for the training of operating unit personnel (users) in the use of equipment and materials. Were the arrangements carried out according to plans? If not, give the reasons, the shortfalls, and the effect on user's performance (refer to Format 1, 2 and 3).

Guideline 2: Identifying Academic/Technical Support Systems

Identify,

(i) The unit/organization responsible for the preparation of instructional and training materials;

(ii) Whether the materials were prepared, reviewed, field tested, revised, and made available in the required quantity, at the right time to the intended users. If not, give the reasons, the shortfalls, and the effect on performance of user units.

(iii) The feedback and other advisory systems and whether they worked in time, to the expected degree of performance. If not, give the reasons, the shortfalls, and the effect on performance of user units.

Guideline 3: Identifying Inter- and Intra-Agency/Organization Co-ordination

Identify,

(i) Departments/agencies/institutions/organizations involved in the programme;

(ii) Tasks assigned to each of the above;

(iii) Nature of the interdependence of tasks;

(iv) Process of monitoring the performance of each of the above;

(v) Performance of each of the above in relation to specified task and in relation to quantity, quality, time, and space. Identity the extent at which each department/agency/institution/organization performed its assigned function/task. In case of shortfalls, give the reasons and the effected on the performance of others, as well as the overall performance.

Format for Analysis

The formats for analysis are presented in the following section.

Format 1: Component-wise Assigned Tasks, Facilities and Budgeted Costs.

Identification: Country _____ Project/Programme Title _____

Sr. No.	Discrete Task Component/Unit	Assigned Tasks Facilities and Budgeted Costs											
		Nature of Assigned Task	Target	Expected date of assigning task	Date on which task actually assigned	Planned Allocation Personnel	Actual Allocation Personnel	Planned Allocation Equipment Materials	Actual Allocation Equipment Materials	Planned Arrangements for Maintenance etc. Services	Actual Arrangement for Maintenance etc. Services	Planned Allocation of Funds	Actual Allocation of Funds
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1													
2													
3													
4													
5													
6													
n													

Note: For each assigned task, target, personnel, equipment and materials, maintenance etc. services, and funds also attach separate sheets giving details.

Format 2: Component-wise Performance and Expenditure (actual cost)

Sr. No.	*Performance and Expenditure**				
	Discrete Task Component/Unit	*Performance (in relation to target)*	*Date of Completion*	*Expenditure (in relation to target)*	*Remarks*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
1					
2					
3					
4					
n					

Note: For each component also attach separate sheets giving details of performance, date of completion and expenditure.

Format 3: Comparison of Expected Performance and Actual Performance, and Reasons for Shortfall

Sr. No.	*Discrete Task Component/Unit*	*Difference Between Expected and Actual Performance in Relation to:*			
		Target	*Date*	*Expenditures*	*Reasons*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
1					
2					
3					
4					
n					

Note: For each component also attach separate sheets giving details of the difference between expected and actual performance in relation to target, date and expenditure, and reasons for shortfall.

Format 4: Component-wise Comparison of Expected and Actual Cost-Effectiveness Ratio

Sr. No.	Discrete Task Component/Unit	Expected Cost and Effectiveness (a)			Actual Cost and Effectiveness			Difference			Reasons for Difference in		
		Cost	Effec-tiveness	CE Ratio	Cost	Effec-tiveness	CE Ratio	Cost	Effec-tiveness	CE Ratio	Cost	Effec-tiveness	CE Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1													
2													
3													
4													
n													

Note: For reasons about the differences in expected and actual costs, effectiveness and CE ratio also attached separate sheets giving details.

(a) The plan document for the programme gives the overall costs and expected results or targets (effectiveness). This is expected cost and expected effectiveness. This provides a "Standard" cost-effectiveness ratio against which actual CE ratio can be compared.

Format 5: Comparison of Different Modalities in Terms of Expected and Actual CE Ratios

Sr. No.	Modality	Expected CE Ratio (Based on Plan Document)			Actual CE Ratio			Difference between Expected and Actual			Reasons for Variation
		Cost	Effec-tiveness	CE Ratio	Cost	Effec-tiveness	CE Ratio	Cost	Effec-tiveness	CE Ratio	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1											
2											
3											
4											
5											
6											
n											

Note: For each modality also attached separate sheets giving details; also explain the difference among the modalities.

Format 6: Comparison of Expected and Actual CE Ratio in Relation to Different Dimensions of Effectiveness for Different Modalities/Methods

Sr. No.	*Modality/ Methods*	*Effectiveness in Relation to Various Discrete Dimensions of Effectiveness*															
			Expected			*Actual Achieved*				*Difference*				*Reasons*			
		D_1	D_2	D_3	D_4	D_1	D_2	D_3	D_4	D_1	D_2	D_3	D_4	D_1	D_2	D_3	D_4
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*
1																	
2																	
3																	
4																	
5																	
6																	
n																	

Note: (1) D_1, D_2, D_3, and D_4 are different dimensions of effectiveness of effectiveness namely awareness, knowledge, attitude and behavioural tendency. The measurement could be either coverage (numbers) and/or intensity (scores);

(2) Also attach separate sheets giving details.

Format 7: Comparison of Expected and Actual CE Ratios in Relation to Different Dimensions of Effectiveness for Different components

Sr. No.	*Components*	*Expected Cost-Effectiveness Ratio for*				*Actual Cost-Effectiveness Ratio for*				*Difference Between Expected and Actual CE Ratios*				*Reasons*			
		D_1	D_2	D_3	D_4	D_1	D_2	D_3	D_4	D_1	D_2	D_3	D_4	D_1	D_2	D_3	D_4
1																	
2																	
3																	
4																	
5																	
6																	
n																	

Note: For each component also attach separate sheets giving details, also explain the difference among the modalities.

CHAPTER SIX

Guidelines for Preparing a Research Proposal

In preparing the country project proposal for the study of cost effectiveness of different training modalities, the following guidelines will be useful. While preparing the proposal all the items listed should be covered. Other items may be added. The proposal should provide the following:

1.0 Introduction/Background

- 1.1 The research problem
- 1.2 Basic assumptions
- 1.3 Importance of the study
- 1.4 Definition of terms

2.0 The Conceptual Framework

- 2.1 Selection of modalities
- 2.2 Review of effectiveness studies

3.0 Design and Methodology

- 3.1 Population and sample
- 3.2 Instruments
- 3.3 Procedure
- 3.4 Data analysis
- 3.5 Format of the report

4.0 Time Frame

- 4.1 Schedule of activities

5.0 Budget

Needless to say, only a meticulously prepared proposal will lead to a systematic research study. Efforts at this stage will go a long way in ensuring the proper coverage of research areas, collection of relevant data, and systematic analysis and conclusions. If necessary, an exploratory study may be conducted before finalizing the proposal. Various secondary sources of information, such as project documents, periodic progress reports, administrative reports, and evaluation studies, should provide the necessary background and other relevant information needed for preparing the proposal.

1.0 Introduction/Background

The introduction should cover the following:

Description and discussion of the strategy and approach followed for population education in the country, stating the political, economic, and social rationale behind such strategy and approach. (Refer to Chapter Two).

Description of all modalities already in operation in the country, as well as the following details for each modality:

i) objectives and rationale,

ii) year introduced,

iii) various components (discrete tasks and sub-tasks),

iv) organizations and agencies involved,

v) vertical and horizontal linkages, and

vi) management structure (refer to Chapter Five on "Management Considerations").

(Give flow chart for each modality as presented in Chapter Two; for management structure chart, refer to Chapter Five).

Description and data on performance in relation to each modality and total (programmewise and yearwise data from the beginning). Performance should be in terms of:

- coverage (number of personnel of different categories trained)
- supportive activities (instructional and training materials developed and distributed)
- some measure of effectiveness, if possible (may be based on earlier evaluation studies)

Details of total population education expenditure incurred by the country for each modality, and the total cost. All items of costs should be covered, such as personnel facilities, materials and equipment, trainees' time and inputs. Data should also be classified under the following heads: fixed costs and variable costs; tangible and intangible costs (refer to Chapter Three). Information on source of funds (own funds, outside funding) should be given.

Drawing from the above,

1.1 Define the research problem of the study.

1.2 Describe the basic assumptions underlying the important issues raised while defining the research problem.

1.3 Discuss the importance of and justification for the study.

1.4 Define the various terms to be used in the study.

Based on the justification, give the specific objectives of the proposed study. Since the study will be diagnostic and remedial, discuss how the study will be useful in the identification of the reasons behind the problems and how the findings will be used for remedial purposes.

It should be noted that the research study itself will be evaluated at its end, based on the objectives cited in the study proposal.

2.0 Conceptual and Theoretical Framework

2.1 Selection of modalities: If funds permit, all modalities used in the country should be covered under this study. Otherwise, select a few giving some justification for each selected modality.

The justification can be based on the following:

(i) degree of effectiveness: those which seem to be more effective vs. those which seem to be less effective.

(ii) coverage: those which seem to be covering a large number of teachers vs. those which seem to cover a small number of teachers.

(iii) amount spent: those for which the expenditure is high vs. those for which it is less.

These three factors and dichotomies can be combined in eight ways.

		Assumed Degree of Effectiveness			
		High		*Low*	
		Amount Spent		*Amount Spent*	
		High	*Low*	*High*	*Low*
Coverage	High	(1)	(2)	(3)	(4)
	Low	(5)	(6)	(7)	(8)

Give brief description of selected modalities. (These modalities are covered under section 2.1 above. Only additional information to be provided here).

2.2 Review effectiveness studies in population education undertaken so far.

3.0 Design and Methodology

3.1 Population and sample

3.1.1 *Locale:* Give a brief profile of the region, covering the following items:

- geographical location, topography, communication.
- population: rural/urban, density, growth rate, male/female, age pyramid, death rate, infant mortality, migration, family size, and so on.
- economic condition: rural/urban areas, class classification, number of people below poverty line, employment opportunities, and so on.
- health: facilities, common diseases and sickness people suffer from, number of doctors, midwives, nurses, and so on.
- family planning: facilities, control measures taken and results (number of operations) (V & B), use of contraceptives, IUD, and so on.
- education: literacy rate (male/female) location of primary, secondary, college education facilities, number of school teachers and students, drop-out rate, male-female ratio for teachers and students, non-formal education programmes and their coverage, government education administrative system, use of mass media, and so on.
- development programmes: government-sponsored and those run by voluntary agencies and others.

3.1.2 Discuss in detail the "population" to be covered under the study.

3.1.3 *Sample design:* Give details explaining the sample design selected for the study (refer to Chapter Three).

3.2 **Instruments:** Give details of instruments to be used for the data collection (refer to Chapter Four).

3.3 **Procedure**

3.3.1 *Approach:* This study can be used as a training ground for the personnel involved in the programme. However, outside experts should also be involved in the conduct of the study. Describe the personnel to be involved in the study (which category of personnel and how they will be involved) and the role and qualification of outside experts.

3.3.2 **Management of the study**

- Agency and officer responsible for conducting the study
- Allocation of work to different agencies/units/organizations
- Co-ordination of work
- Process of conducting the study (that is, meetings, visits by the manager of the team, and so on).

3.4 *Data analysis:* Give details about the data analysis framework and the statistical methods to be used.

3.5 *Format of the report:* Give chapter scheme, providing a brief description of the content of each chapter.

4.0 Time frame: indicate how much time will be required to complete the study. (As far as possible, the study should be completed within a year).

4.1 **Schedule of operations:** Describe detailed work plan and monitoring that will be followed, concurrent with evaluation system.

5.0 Budget

5.1 Give detailed break down of costs: personnel, materials, travel, secretarial assistance, data analysis cost, including computer use cost, report preparation, publication, and so on.

5.2 Give sources of funds from which the cost of study will be met.

CHAPTER SEVEN

Sample Research Proposal and Prototype Instruments

This chapter illustrates the use of the guidelines in Chapter Six. It applies the concepts developed in Chapter Three on evaluation design and instrumentation.

The chapter consists of two parts. The first part is a proposal for a cost effectiveness study of training modalities; the second part presents sample instruments for use in the research.

A. Research Proposal: *A Cost-Effectiveness Study of Three Training Modalities in Population Education*

1.0 Introduction

Population education programmes as carried out in countries in the Asian region have some built in form of evaluation to determine the effects of projects in the programme or of the programme itself. However, few countries have integrated a cost analysis in the evaluation.

The training of large numbers of population education teachers entails huge expenditures. A number of modalities for training have been tried out, with no serious consideration given to the costs of implementing them. In the face of increasing financial constraints, costs can no longer be ignored. Funds and logistical support from sponsors and donors are dwindling. Therefore, decisions on how funds are to be spent should be more carefully studied and empirically based. Decision makers will have to confront such questions as "Are the modalities equally effective? How do the modalities compare in cost? Which modality entails the least cost for the best effects?" These questions imply a cost effectiveness analysis.

1.1 The Research Problem

This study aims to evaluate three commonly used training modalities in population education in country K, in terms of their effectiveness and the cost of using them.

The three training modalities to be evaluated for effectiveness are: (i) mobile training, (ii) modular, that is, use of print and audio-materials, and (iii) institute-based seminars.

Specifically, the study aims to answer these questions:

1) How do the three training modalities compare in improving the trainees' knowledge of population concepts?
2) Which training modality results in more favourable attitude change in the trainees?

3) What are the effects of the three training modalities on the trainees?
   3.1 Behaviour intent/tendency?
   3.2 Skills in teaching population education concepts?
4) What costs are incurred through each modality?
5) Which training modality is the least expensive on a per trainee basis?
6) Which training modality is the most cost effective?
7) Which training modality is the most effective in terms of:
   7.1 Breadth of coverage?
   7.2 Intensity of effectiveness?
   7.3 Efficiency?

1.2 Basic Assumptions

In this study it is assumed that:

1) All the three training modalities have the same objectives.
2) For all the three modalities, the same instruments of evaluation can be used.
3) Costs for capital outlay, like buildings and infrastructures, need not be included in the costing of the training modalities, unless funds are specifically earmarked for these and are tangible.
4) Measures of knowledge, attitude and behaviour intent are continuous interval scale variables.

1.3 Importance of the Study

The research is expected to yield empirical data on the relative costs of using different training modalities and approaches, to guide decision makers, programme planners, and policy makers on the choice of modalities for maximum effects.

The study is also envisioned to provide insights on how population education concepts can be best learned, as well as to help diagnose the weaknesses of some training programmes. Knowing the weakness of individual programmes will facilitate the introduction of remedial measures and the modification of a programme to increase its effectiveness.

1.4 Definition of Terms

Effectiveness refers to the extent at which the objectives of a programme, project, or intervention are attained.

Indicator of effectiveness refers to a measure by which to ascertain whether the objectives have been attained.

Effects refer to the outcomes or results of an intervention or treatment.

Cost, in this study, refers to the value of all the resources and ingredients needed to carry out a training modality.

Cost effectiveness is the ratio of cost or the expense in carrying out a project (in this case, a training modality) to its outcome or effectiveness. The ratio is obtained by dividing the cost per trainee by the measure of effectiveness.

Training modality is a general approach and strategy of designing and sequencing training inputs to produce the desired effectiveness. It may use more than one method or instrument of training.

Efficiency is the ratio of output to input.

Cost efficiency is the ratio of cost to the number of persons trained.

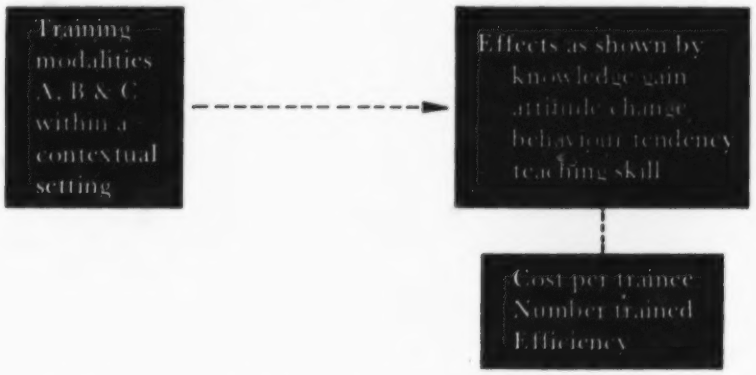
2. The Conceptual Framework

The main independent variable in this study is the training modality. The dependent variables are:

(1) Effectiveness as measured by knowledge gain, attitude change, and effects on behaviour and teaching skills, and

(2) Cost of carrying out the training.

This is illustrated in the following research paradigm:


Training modalities A, B & C within a contextual setting
Effects as shown by knowledge gain attitude change behaviour tendency teaching skill
Cost per trainee
Number trained
Efficiency

The paradigm indicates that the training modality leads to the indicated outcomes, which are associated with certain costs and efficiency.

3. Design and Methodology

This study will use the multiple group pre-test post-test design in evaluating the effectiveness of the three training modalities. The design is represented as follows:

O_{1b}	X_1	O_{1a}
O_{2b}	X_2	O_{2a}
O_{3b}	X_3	O_{3a}

Where O_bs are measures obtained *before* the training

O_as are measures obtained *after* the training

Xs are the three training modalities

This design will be used for measuring effectiveness as indicated by

1) Knowledge gain, and

2) Attitude change.

An alternative design is the multiple group post-test only design. It is represented as follows:

X_1	O_1
X_2	O_2
X_3	O_3

Here the Xs and Os represent training modalities and post-test measures, respectively.

This design is used to determine the effectiveness of the modalities in terms of indicators of behavioural intent or tendency.

In case of a follow-up of the trained teachers, and an observation study of their skill in teaching population education concepts, say six months after the training, the multiple group, immediate and delayed post-test design will be used. In symbols, the design is:

Training Modality	*Immediate Post-test*	*Delayed Post-test*
X_1	O_{11}	O_{12}
X_2	O_{21}	O_{22}
X_3	O_{31}	O_{32}

3.1 Population and Sample

The sample population consists of teachers to be trained in population education through any of these modalities: (a) seminars conducted by a college or institute of education, (b) mobile training team, and (c) modular training through print modules and audio tapes.

The sample will consist of:

a) Two batches of 25 to 30 teachers trained through modality A.

b) 50 teachers trained through modality B.

c) 30 teachers trained through modality C.

Since the training batches will come at specific times and the mobile training will be carried out within a pre-set schedule, the teachers cannot be selected through random sampling.

3.2 Instruments

Four instruments will be used, corresponding to the research questions on (a) knowledge gain, (b) attitude change, (c) behavioural intent or tendency, and (d) teaching skills. The instruments are as follows:

1) A knowledge test consisting of 40 items of the multiple choice type, with four response options per item, will be used. The trainees' total score on this test is a measure of his knowledge of population concepts.

The test will be administered before the start and at the end of the training. The difference between the post-training and pre-training scores is the measure of gain in knowledge.

2) An attitude scale consisting of 20 Likert-type items will be used to measure trainee attitude toward population themes and messages. The respondent is instructed to register his agreement or disagreement with each statement. Each response has a weight on scale of 1 to 5. The respondent's total score reflects his attitude. The higher the score, the more favourable the attitude. The 20-item scale will yield a minimum score of 20 and a maximum score of 100.

3) The instrument to measure behaviour intent or behaviour tendency is a situation test. It consists of 10 situations, each posing a problem and asking the respondent to identity which of the behaviours described he or she will most likely do in a particular situation. Each response option has a weighted score. The total score from the 10 items is an index of the respondents' behaviour intent/tendency. The higher the score, the better the behaviour intent index.

4) A teacher performance scale will be used to rate the trainee's teaching skills. This is an observation rating scale to be filled out by an observer as he watches a teacher actually teaching. The teacher is rated on a 5-point scale, to measure ten teaching skills. The higher the total score, the better is the teacher's teaching performance. The minimum and maximum scores are 10 and 50, respectively.

All these four instruments are illustrated through sample items in the latter part of this chapter.

3.3 Procedure

The knowledge test and the attitude scale will be administered before and after the training, to each training modality group. The behaviour intent scale and the teacher performance scale will be administered after the training. The teacher performance scale will be used again six months after the training, in a follow-up of the teacher trainees.

3.4 Data Analyses

Mean pre-test and post-test scores and standard deviations of the scores on each of the instruments will be computed. Appropriate statistical tests will be used to compare the effectiveness measures of the groups trained by the three modalities.

The costs of conducting training by each modality will be computed, based on the following main ingredients: personnel, facilities, equipment, other programme inputs and client inputs.

The cost per trainee under each modality will be computed. This cost will then be compared to each effectiveness index. The ratio of cost per trainee to the effectiveness index is the cost effectiveness measure.

The cost effectiveness ratios of the three training modalities will then be compared. The modality with the lowest cost effectiveness ratio is the most cost effective for a given effectiveness index.

The efficiency of each training modality will be computed by obtaining the ratio of the effectiveness to the inputs.

Effectiveness in terms of coverage is obtained by dividing the number of teachers actually trained by the targeted number to be trained.

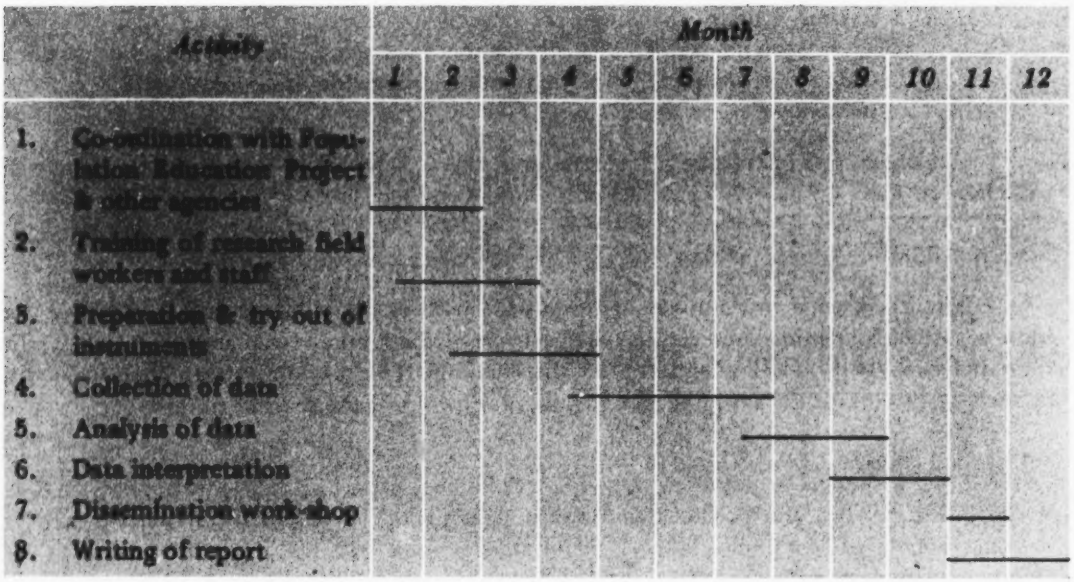
The intensity index of effectiveness of each modality is the ratio of the number of teachers trained who meet a criterion level of performance, to the total number of teachers trained.

Tables similar to those in Chapter Four will be set up for the cost effectiveness analysis.

4. Time frame: This research is estimated to take at least one year from the date of approval of the proposal.

4.1 Schedule of Activities: This is shown in the Gantt Chart on the next page.

Gantt Chart for Schedule of Activities



5. Budget

Line-Item Budget for One Year of Research

Personal Services		$14,750
Project Director's honorarium	$3,000	
Research Associate	2,250	
Two (2) Research Assistants	3,900	
Clerk Typist	1,000	
Utility man/aide	750	
Honoraria for two (2) consultants à$15 per consultation fc 2 x 20 consultations	600	
Travel and per diem	3,000	
Honoraria and incentives for co-operators/ informants	250	
Training		$ 750
Equipment		1,500
Expendables: materials, paper etc.	$1,000	
Non-expendables: furniture, etc.	500	
Miscellaneous		1,400
Computerization of data	750	
Printing of report	250	
Sundry: postage, communication, etc.	400	
Sub-total		$18,400.00
Contingency 10%		1,840.00
GRAND TOTAL		$20,240.00

B. Prototype Instruments*

1. *Knowledge Test*

Instruction: Check (√) the space before the correct answer.

Concept I: Small family size and family welfare.

1. The immediate goal of population education is to:

   _____ (a) stress family planning as a means of regulating fertility behaviour

   _____ (b) slow down population growth

   _____ (c) provide background information for rational and responsible behaviour concerning population related matters

   _____ (d) adopt a two-child family norm

2. Which phrase does *not* describe family planning?

   _____ (a) limiting the number of children

   _____ (b) a way of ensuring a high quality of life for the family

   _____ (c) disallowing unwanted children

   _____ (d) regulating and spacing the birth of children

3. Which of these refers to the biological capacity of a women to reproduce?

   _____ (a) fertility _____ (c) heredity

   _____ (b) fecundity _____ (d) morbidity

4. A good quality of life may be attained by

   _____ (a) small family size, high income

   _____ (b) large family size, high income

   _____ (c) small family size, low income

   _____ (d) large family size, low income

5. Which of the following phrases defines the concept of "completed family size"?

   _____ (a) the total number of living children born to a woman during her reproductive period

   _____ (b) the total number of children born to a woman, including still births

   _____ (c) the total number of members in the nuclear family – father, mother and children

   _____ (d) the number of children ever born to a woman, including those who died after birth

6. Spacing of births results in

   _____ (a) proper nutrition of mother and child

   _____ (b) lower infant mortality rate

   _____ (c) reduced incidence of defective children

   _____ (d) all of the above

* The answer key is presented at the end of the chapter.

7. Which of the following gives the best meaning of "quality of life" in the population education context?

_____ (a) having the basic necessities and the important aids to modern living

_____ (b) enjoying life that is free from the cares of looking after too many children

_____ (c) seeing that children are given all that they desire

_____ (d) being able to lead a healthy, comfortable and cultured life

8. Who are the most greatly affected in terms of decreased mortality when improved health services are introduced to a country?

_____ (a) old people

_____ (b) infants

_____ (c) young adults

_____ (d) school-aged population

Concept II: Delayed Marriage

1. Which of these would most likely result from delayed marriage?

_____ (a) ill health to the mother-to-be

_____ (b) fewer children being born

_____ (c) better income for the family

(d) more defective children

2. As a general rule, a delayed marriage is likely to result in

_____ (a) higher fertility

_____ (b) higher sex impulse

_____ (c) lower fertility

_____ (d) lower sex impulse

Concept III: Responsible Parenthood

1. What does "responsible parenthood" mean?

_____ (a) complete control of all the activities of the family

_____ (b) achieving a high quality of life for all members of the family

_____ (c) allowing maximum freedom to all members of the family

_____ (d) having enough money to meet the food needs of all members of the family

2. "A woman is capable of conceiving a child for about one week each month"

_____ (a) The statement is true

_____ (b) The statement is false

_____ (c) The statement is half true

_____ (d) The statement is incomplete

3. Sex education is the concern of

_____ (a) the home
_____ (b) the school
_____ (c) both (a) and (b)
_____ (d) neither (a) nor (b)

Concept IV: Population and Other Development Concerns

1. Which group of factors must be known to estimate the population of a few years hence?

_____ (a) birth rate, family size, death rate
_____ (b) birth rate, death rate, migration rate
_____ (c) birth rate, infant mortality rate, death rate
_____ (d) birth rate, family size, infant mortality

2. The difference between the birth rate and the death rate is called the rate of

_____ (a) growth
_____ (b) fertility
_____ (c) natural increase
_____ (d) population growth

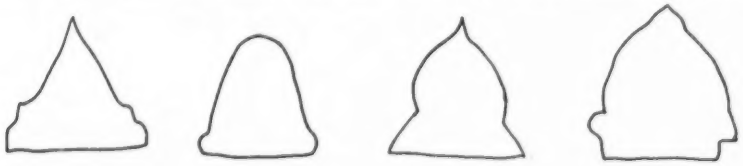
3. To compute the growth rate of the population of a country, person must know the natural increase and

_____ (a) migration rate of the nationals
_____ (b) migration rate of the foreigners
_____ (c) net migration rate
_____ (d) number of country home visits during the year

4. Which of the following groups of demographic factors is indicative of a developed country?

_____ (a) high birth rate, high death rate, low infant mortality rate
_____ (b) high birth rate, low death rate, low infant mortality rate
_____ (c) low birth rate, low death rate, low infant mortality rate
_____ (d) low birth rate, high death rate, high infant mortality rate

5. Which of the following shapes of the population pyramid represent that of a country which has been a developed country for a number of years?



_____ (a) _____ (b) _____ (c) _____ (d)

6. Which is the set of consequences of rapid population growth?

_____ (a) arable land scarcity, industrialization, overcrowding of schools.
_____ (b) arable land scarcity, unemployment, overcrowding of schools.
_____ (c) unemployment, overcrowding of schools, industrialization.
_____ (d) industrialization, high school drop-out rate, high mortality rate.

7. A country has a high dependency group if it has a big population of people.

_____ (a) under 15 years of age
_____ (b) 65 years of age and over
_____ (c) between 45 and 65 years of age
_____ (d) both under 15 years of age and 65 years of age and above

8. Which factor does *not* affect population distribution?

_____ (a) physical or natural factors
_____ (b) cultural factors
_____ (c) demographic factors
_____ (d) biological factors

Concept V: Population Beliefs and Values

1. How does breastfeeding affect fertility?

_____ (a) it improves the health of the mother.
_____ (b) it delays ovulation.
_____ (c) it prevents conception.
_____ (d) it decreases sex impulse.

2. In countries where sex education has been taught, we are likely to see

_____ (a) fewer abortions
_____ (b) more sexual promiscuity
_____ (c) more incidence of sex violence
_____ (d) reduced birth rate

3. In countries where sex equality is promoted, one is likely to find

_____ (a) more family planning practices
_____ (b) more divorces
_____ (c) problems of homosexuality
_____ (d) none of the above

4. In the present age, the main basis of economic progress is

_____ (a) advanced technology
_____ (b) more natural resources
_____ (c) number of population
_____ (d) strong leadership

Concept VI: Urbanization and Migration

1. Where will sex violence and abortion likely to occur?

_____ (a) in the heavily populated areas in the city
_____ (b) in the rural areas
_____ (c) in the industrialized parts of the country
_____ (d) among the working class

2. A head count of the population that is taken periodically is called a

_____ (a) poll
_____ (b) census
_____ (c) registration
_____ (d) demographic survey

3. Overcrowded areas in the city, often referred to as "slums", are caused by

_____ (a) lack of space in the city
_____ (b) low rent in the slums
_____ (c) safety in city life
_____ (d) heavy inflow of migrants from the rural areas

4. Which of these will likely be the most effective measure for reducing overcrowding in the city?

_____ (a) building more houses in the suburbs
_____ (b) putting more efforts on rural development and encouraging a small family size
_____ (c) fast industrialization of the city
_____ (d) all of the above

Concept VII: Problems of Adolescence

1. Drug addiction incidents are likely to occur among youth

_____ (a) with very high ambitions
_____ (b) from migrant families
_____ (c) from broken families
_____ (d) in rural areas

2. The real sign that a girl is becoming a woman is the

_____ (a) development of the breasts
_____ (b) growth of pubic hair
_____ (c) onset of menstruation
_____ (d) widening of the hips

3. "Wet dreams" are due to the discharge of excess semen in a boy's sex organ. This is referred to as

_____ (a) circumcision
_____ (b) nocturnal emission
_____ (c) transmission
_____ (d) castration

4. A basic knowledge of the human reproductive process helps one understand

_____ (a) man's full development
_____ (b) sexual impulse
_____ (c) avoidance of pregnancy
_____ (d) man's social nature

5. Sexual intercourse during ovulation

_____ (a) causes menstrual flow
_____ (b) may result in pregnancy
_____ (c) prevents pregnancy
_____ (d) is not medically advisable

Concept VIII: Aging

1. The number of old people is likely to be greater in

_____ (a) a developed country
_____ (b) a developing country
_____ (c) an underdeveloped country
_____ (d) both (a) and (c)

2. Generally, women as compared to men have

_____ (a) longer lives
_____ (b) shorter lives
_____ (c) more income
_____ (d) better jobs

3. Old people usually cling to their old beliefs and become resistant to change, especially when it comes to health care and services. This results in _____ incidence of diseases and _____ mortality

_____ (a) low – low
_____ (b) low – high
_____ (c) high – high
_____ (d) high – low

Concept IX: Sex Equality

1. In relation to men, women are

_____ (a) subordinate to men if they are younger
_____ (b) superior to men if they are older
_____ (c) equal to men if they are of the same age
_____ (d) equal to men regardless of age

2. *Attitude scale*

Samples rating scale to measure attitudes towards population education

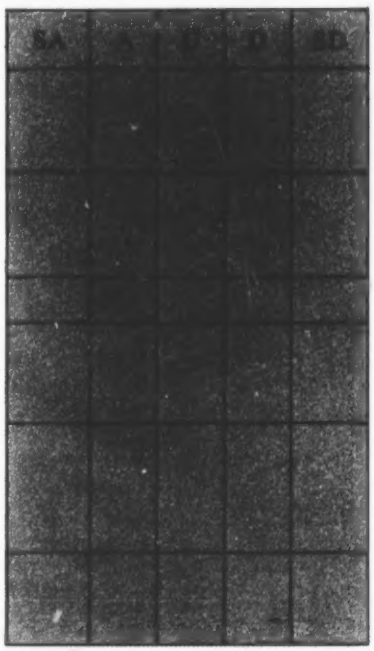
Instruction

Circle the letter that matches the extent of your agreement or disagreement with each of the following statements. The letters have these meanings:

SA – strongly agree
A – agree
U – undecided
D – disagree
SD – strongly disagree

Concept: Small family size

1. Married couples should be free to have as many children as they desire.
2. Having a large family (more than four children) is a good economic insurance for old age.
3. A large family is a happy family.
4. The more children a farm family has, the higher will be its per capita production.



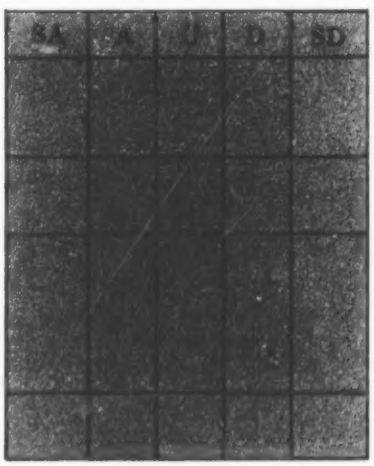
Concept: Age at marriage

1. The ideal age at marriage for women should be at least 25 years old.
2. To avoid having more children, early marriage should be discouraged.

SA = 1 A = 2 U = 3 D = 4 SD = 5

Concept: Sex-related values

1. Sex education is one of the solutions to rapid population growth in the country.
2. Sex education tends to encourage pre-marital sex relationships.



Concept: Equality of the sexes

1. Women should be encouraged to work as much as men outside the home.
2. The first child in the family must be male.

3. Women should have equal rights as men in decision making.
4. If the family can efford to send only one child to school, that child must be a boy.
5. Women doctors are not as good as men doctors.

Concept: Respect for the aged

1. The welfare of the old people is a responsibility of the government.
2. It is the responsibility of every member of the family to look after its elders.

Concept: Emerging roles of women

1. Women should go to the battle field to defend their country.
2. Women should help their husbands to earn a living.

3. *A Behaviour-Intent Scale*

Instruction: Mark (√) the option that you think is correct.

Concept: Population Education Programme

1. If you are requested to give a lecture on population education at a local school, what will be your reaction?

   _____ (a) Ignore the invitation because the topic is not appropriate.

   _____ (b) Accept the invitation but talk on other subjects more appropriate to children.

   _____ (c) Accept the invitation and talk on the subject in detail.

   _____ (d) Ask for more time to decide.

2. You are a member of a teachers' union. You are requested to provide a lecture on the role of teachers in implementing the population programme. Which message will you emphasize in the lecture?

   _____ (a) Teachers have a responsibility to implement the population education programme.

   _____ (b) Teachers should ignore the population programme because the problem is not of their creation.

   _____ (c) Teachers should attempt to study more about the population education programme.

   _____ (d) Teachers should oppose the programme.

Concept: Age at marriage

3. You are asked by the members of Parliament to come to the national legislature to advise them on the age at marriage. What will you suggest to Parliament?

_____ (a) Decrease the age at marriage for both male and female.

_____ (b) Increase the age at marriage for both male and female.

_____ (c) Keep the present age law but suggest counselling for would-be couples.

_____ (d) Present no definite opinion.

Concept: Equality of the sexes

4. You have two children – a son and a daughter. The government has provided you a seat in a prestigious college and you are allowed to send either your son or daughter, both of whom have just completed high school. How will you behave?

_____ (a) Enroll your son.

_____ (b) Enroll your daughter.

_____ (c) Enroll whoever gets the higher score in the entrance exam.

_____ (d) Enroll whoever is elder.

Concept: Small family size and family welfare

5. Mr. and Mrs. Cruz have been married six years and have two daughters. They get different advice from relatives and friends:

_____ (a) "Keep trying to have children until you get a son."

_____ (b) "Be content with your two daughters. They are as good as sons."

_____ (c) "Try for another child but stop at three children."

_____ (d) "Leave everything to Providence or God's Will."

If you were in Mr. and Mrs. Cruz's place, which advice are you likely to follow?

Concept: Aging

6. You've been living with your aging father for the past ten years. Your family feels that they should live separately from your father. What would you do?

_____ (a) Put him in a separate house and visit him regularly.

_____ (b) Ask other relatives to take him in.

_____ (c) Continue to live with him with due respect and care.

_____ (d) Continue to live with him but without caring for him.

Concept: Family planning

7. In the presence of your wife, your friend asks you about the various contraceptive methods. How will you respond to this querry?

_____ (a) Explain everything in detail to him.

_____ (b) Explain everything to him but only after your wife has left.

_____ (c) Do not answer him.

_____ (d) Direct him to a family planning worker or clinic.

4. A Scale for Rating Teaching Skills

Rating scale for teaching skills in population education.

Teacher: _____ Rater: _____

Please rate the performance of the teacher on the following teaching skills by checking (√) the appropriate column.

Skills	*Excellent*	*Very good*	*Good*	*Poor*	*Very poor*
1. Writing lesson plans					
2. Citing relevant examples to illustrate concepts					
3. Presenting population concepts clearly					
4. Integrating population education concepts					
5. Using appropriate visual aids, (charts, boardworks, flash cards, etc.)					
6. Preparing visual aids (charts, boardworks, flash cards, etc.)					
7. Constructing test items					

Answer and Scoring Key

1. Knowledge Test

Concept I – Small family size and family welfare

1) c
2) c
3) b
4) a
5) a
6) d
7) d
8) b

Concept II – Delayed marriage

1) b
2) c

Concept III – Responsible parenthood

1) b
2) b
3) c

Concept IV – Population and other development concerns

1) b
2) c
3) c
4) c
5) b
6) b
7) d
8) d

Concept V – Population beliefs and values

1) b
2) d
3) a
4) a

Concept VI – Urbanization and migration

1) a
2) b
3) d
4) b

Concept VII – Problems of adolescence

1) c
2) c
3) b
4) c
5) b

Concept VIII – Aging

1) a
2) a
3) c

Concept IX – Sex equality

1) d

2. *Attitude Scales*

The scoring is:

SA = 5
A = 4
U = 3
D = 2
SD = 1

In items marked with an asterisk (*), the scoring is reversed, i.e.

SA = 1
A = 2
U = 3
D = 4
SD = 5

Concept: Small family size

1. *
2. *
3. *
4. *

Concept: Age at marriage

1.
2.

Concept: Sex-related values

1.
2. *

Concept: Equality of the sexes

1.
2. *
3.
4. *
5. *

3. *Behaviour Intent*

Concept: Population education programme

1. a – 1 pt.
   b – 3 pts.
   c – 4 pts.
   d – 2 pts.
2. a – 4 pts.
   b – 2 pts.
   c – 3 pts.
   d – 1 pt.

Concept: Age at marriage

3. a – 1 pt.
   b – 4 pts.
   c – 3 pts.
   d – 2 pts.

Concept: Equality of the sexes

4. a – 2 pts.
   b – 1 pt.
   c – 4 pts.
   d – 3 pts.

Concept: Small family size and family welfare

5. a – 1 pt.
   b – 4 pts.
   c – 3 pts.
   d – 2 pts.

Concept: Aging

6. a – 2 pts.
   b – 3 pts.
   c – 4 pts.
   d – 1 pt.

Concept: Family planning

7. a – 3 pts.
   b – 2 pts.
   c – 1 pt.
   d – 4 pts.